22/19

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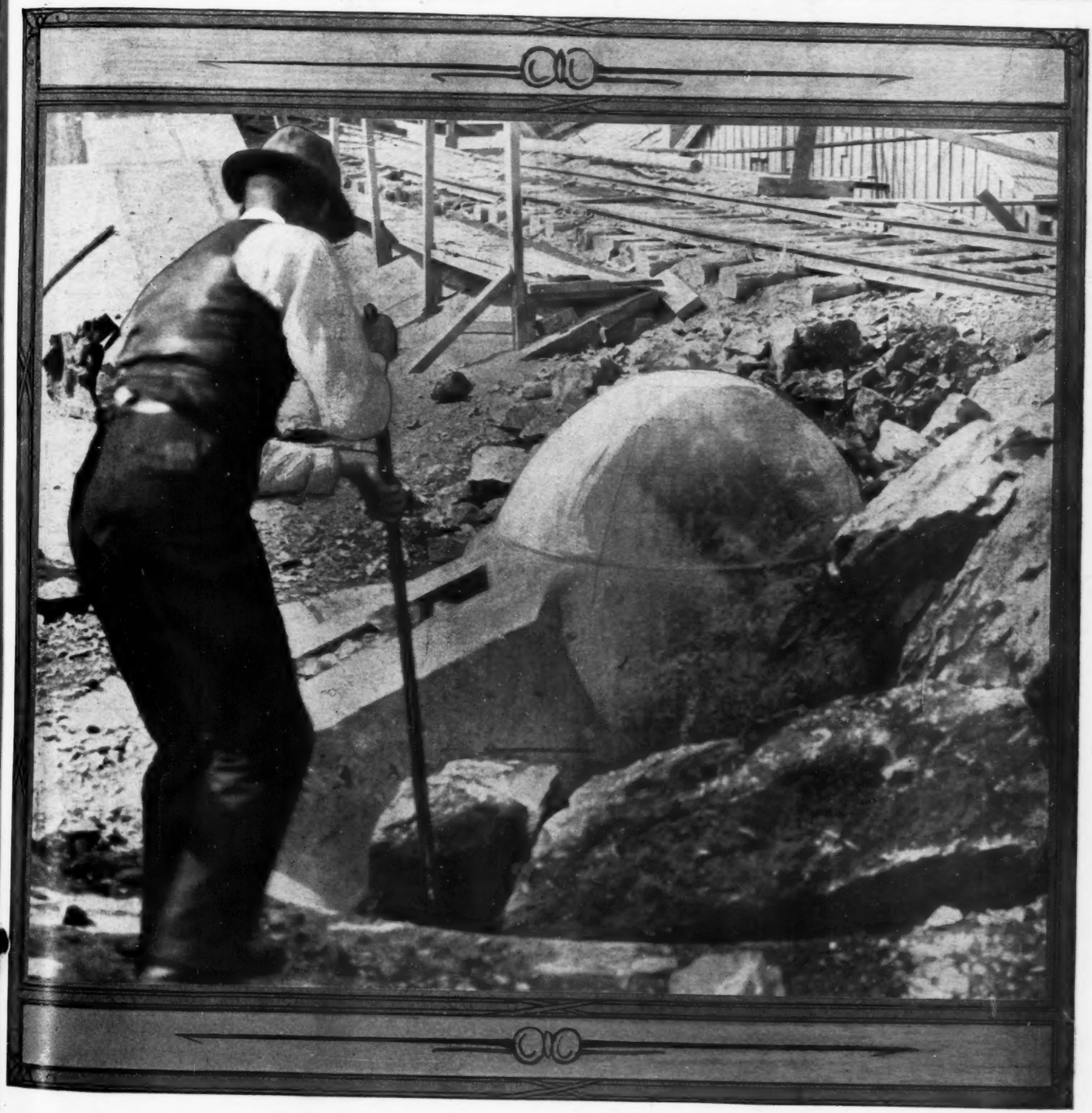
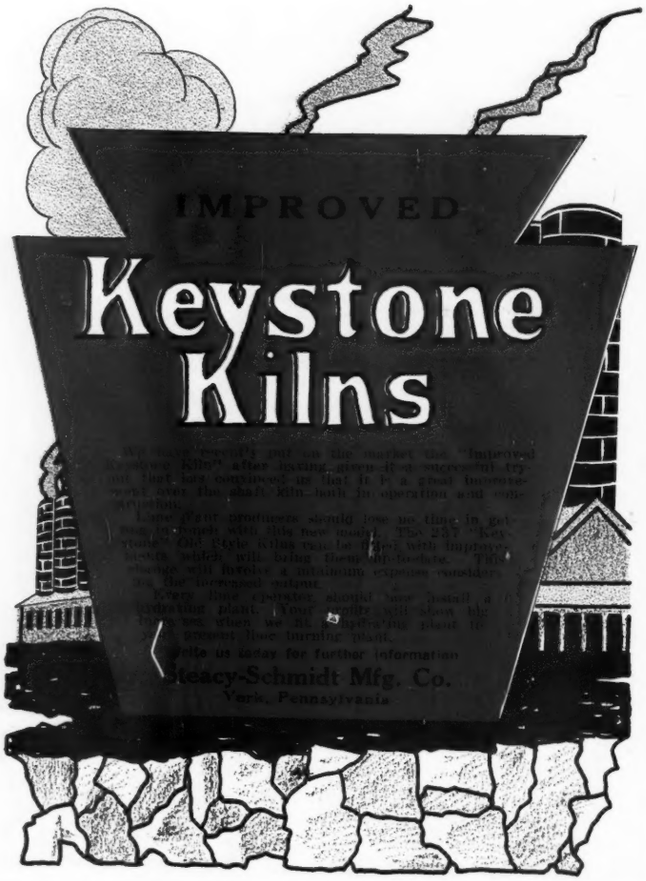
Rock Products

$2.00 A YEAR CHICAGO SEPTEMBER 13, 1919



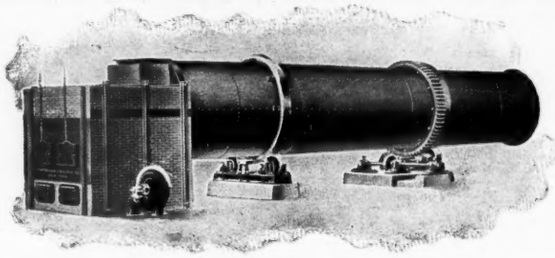


"PENNSYLVANIA"
Hammer Crushers

PATENTED

For Crushing and Pulverizing Lime, Limestone, Gypsum, Marl, Shale, Etc. Main Frame of Steel, "Ball and Socket" Self Aligning Bearings; forged Steel Shaft; Steel Wear Liners; Cage adjustable by hand wheel while Crusher is running. No other hammer Crusher has such a big Safety Factor.

Pennsylvania Crusher Company
New York PHILADELPHIA Pittsburgh



DRYERS
AMERICAN PROCESS CO. 68 Williams Street NEW YORK CITY

ATTENTION

Cement Manufacturers and Supply Dealers

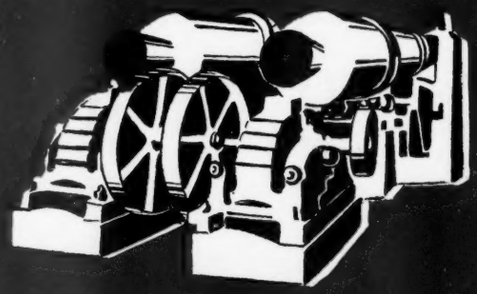
Some of our customers who are using our Puncture and Waterproof bags report one-third increased sales to their satisfied customers. Also report breakage for 1917 and 1918 from all causes only one-half of one per cent.

THE JAITE CO.
JAITE, OHIO
Sole Manufacturers

F. L. SMIDTH & CO.
50 CHURCH STREET NEW YORK

Engineers

CEMENT MANUFACTURING PLANTS
CEMENT MAKING MACHINERY
PULVERIZED COAL INSTALLATIONS
GRANULATING AND PULVERIZING MACHINES FOR ALL MATERIALS
FLINT PEBBLES—SILEX LINING
THE LENIX BELT DRIVE



1000 In Use—24% On Repeat Orders

That's a good enough record to win over any skeptic, isn't it? It proves at once both the widespread use and the merit of

RUGGLES-COLES DRYERS

They're built to dry at lowest ultimate cost. Run readily twenty-four hours per day, year in and year out.

We will be pleased to answer any of your drying problems. We are in business not only to sell but to serve.

RUGGLES-COLES ENGINEERING CO.
50 Church St. New York City — Works: York, Penna. — 332 S. Michigan Ave. Chicago, Ill.

ROCK PRODUCTS is published every other week by Tradepress Publishing Corporation, 542 So. Dearborn St., Chicago. Subscription: $2.00 a year in the United States, $3.00 in Canada. Entered as second class matter July 2, 1907, at the postoffice in Chicago, under Act of March 3, 1879.

VOL. XXII—No. 19
Sept. 13, 1919

Rock Products seeks and reports everything of interest to producers of crushed stone, sand, gravel, lime, cement, gypsum products, agricultural limestone, phosphate, potash and glass sand. It spends many times more money than any other journal of the industry to compile its message every two weeks. Appreciate Rock Products.

Rock Products

26 Big Issues for $2

Stands without a peer in the industry. It serves the plant owners without stint or bias. Its reading pages are loaded with pictures and news.

Its advertisements are on advertising pages—where in fairness to all—they belong.

Read Rock Products—not because it serves you unselfishly but because it is the best paper. Subscribe!

Fill Out and Mail the Coupon—Now!

ROCK PRODUCTS, 542 So. Dearborn St., Chicago

Here is my $2.00 for a full year's subscription to ROCK PRODUCTS.

Name.....

Address.....

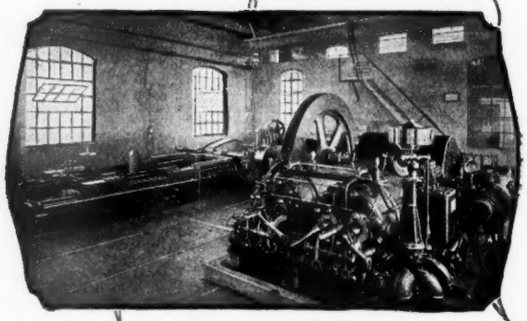
Saying, "I saw it in ROCK PRODUCTS," will bring quick action

131,000 hours without any repair costs

TWENTY-FOUR hours a day 364 days a year. For the last 15 years, that has been the schedule of a Deane Power Pump used by the Vacuum Oil Company. For only a few hours each year the pump is stopped to renew packing — no breakdowns, no repair costs.

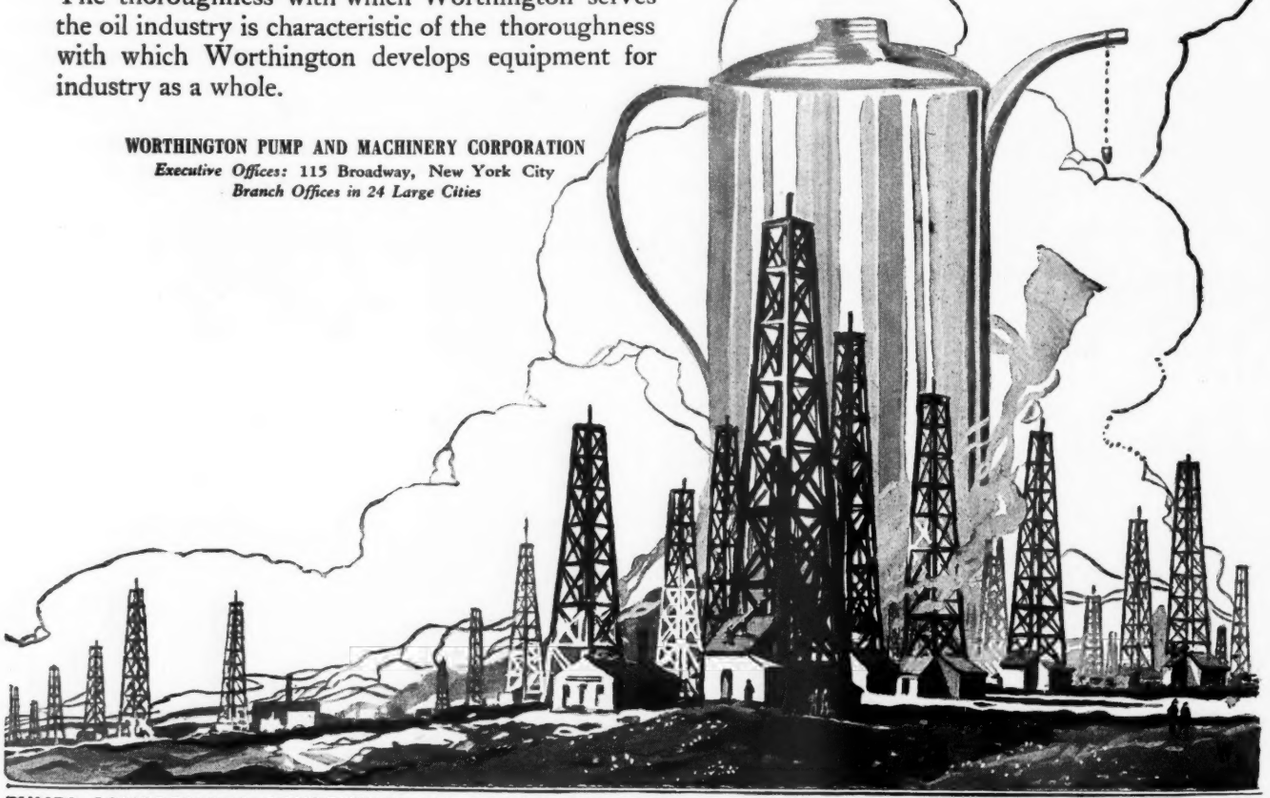
Through such records as this Worthington has become a big factor, not only in the refineries but in the oil fields as well. Today every important oil field in the world is using Worthington equipment. While Worthington crude oil engines are furnishing power, Worthington pumps are putting pressure in the pipe lines and Worthington meters are measuring the flow.

The thoroughness with which Worthington serves the oil industry is characteristic of the thoroughness with which Worthington develops equipment for industry as a whole.



250 h. p. Snow Oil Engine, Direct-connected to Deane Horizontal Oil Line Pump.

WORTHINGTON PUMP AND MACHINERY CORPORATION
Executive Offices: 115 Broadway, New York City
Branch Offices in 24 Large Cities



PUMPS—COMPRESSORS—CONDENSERS—OIL & GAS ENGINES—METERS—MINING—ROCK CRUSHING & CEMENT MACHINERY

WORTHINGTON

Deane Works, *Holyoke, Mass.* Hazleton Works, *Hazleton, Pa.* Laidlaw Works, *Cincinnati, Ohio* Gas Engine Works, *Cudahy, Wis.*
Blake & Knowles Works *East Cambridge, Mass.*
Worthington Works *Harrison, N. J.*
Power & Mining Works *Cudahy, Wis.*
Snow-Holly Works *Buffalo, N. Y.*

Cooperation is the thing—please mention ROCK PRODUCTS

Another Leviathan Making a Record

Carrying 250 tons of run-of-mine gravel per hour

SINCE March, 1916, this belt, 254′ x 30″ x 8 ply, has run over Main Belting Style "C" rollers. It travels 250 feet per minute.

Besides furnishing the tough, elastic, nearly abrasion proof belt, we supplied rollers correctly designed and of the best material. We are the only belting concern making rollers, by the way.

Old style rollers trough too deeply; besides they fail to give support in the middle where the greatest load is carried. Belts invariably creased and cracked lengthwise before wearing out.

Style "C" rollers are flat where they should be and the edges adjust to just the angle needed to carry the load without spillage. The Leviathan man will be glad to figure all the details of any conveying problem you may have.

LEVIATHAN AND ANACONDA ELEVATING TRANSMITTING CONVEYING BELTING

MAIN BELTING COMPANY - - Philadelphia

New York Boston Chicago Pittsburgh Atlanta San Francisco

LEVIATHAN AND ANACONDA ELEVATING TRANSMITTING CONVEYING BELTING

For better service say, "I saw it in ROCK PRODUCTS"

BROWNING

"The All-Around Champion"

THE illustration below shows one of many Browning Locomotive Cranes at work at Hog Island in 1918. The brutal, gruelling strain of twenty-four hours a day of feverish, high-speed work was a test of both men and machines. That the Browning Crane came through with the highest praise is known to all who were connected with that seething hive of industry.

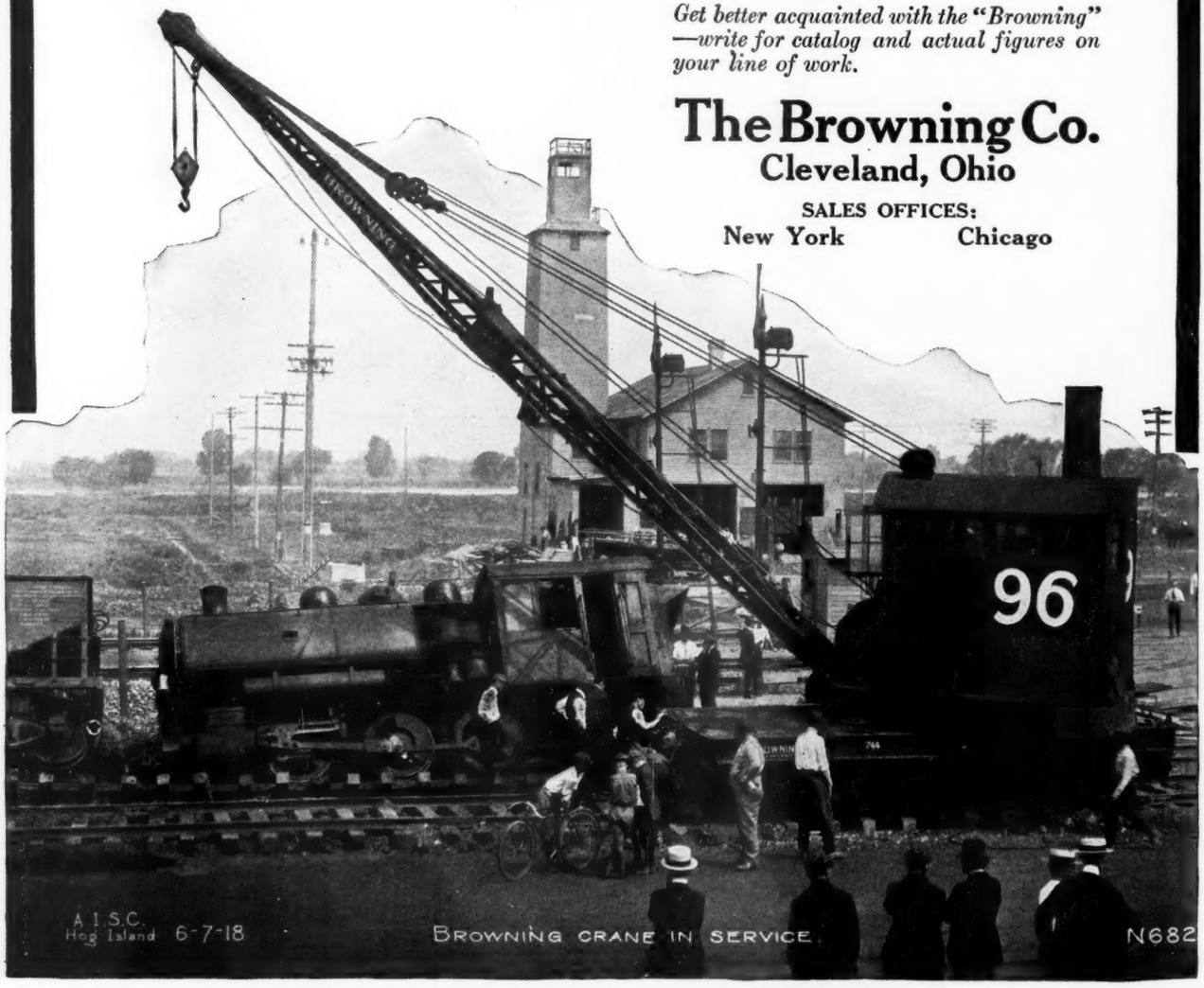
Browning Locomotive Cranes were chosen for this work because of the fact that they are known as the "All-Around Champion"—because of their known ability to do the widest range of work possible to a locomotive crane. A "Browning" will successfully handle a bucket for any work that can be done with a bucket. It will also handle a hook block, sling, wood grapple or magnet.

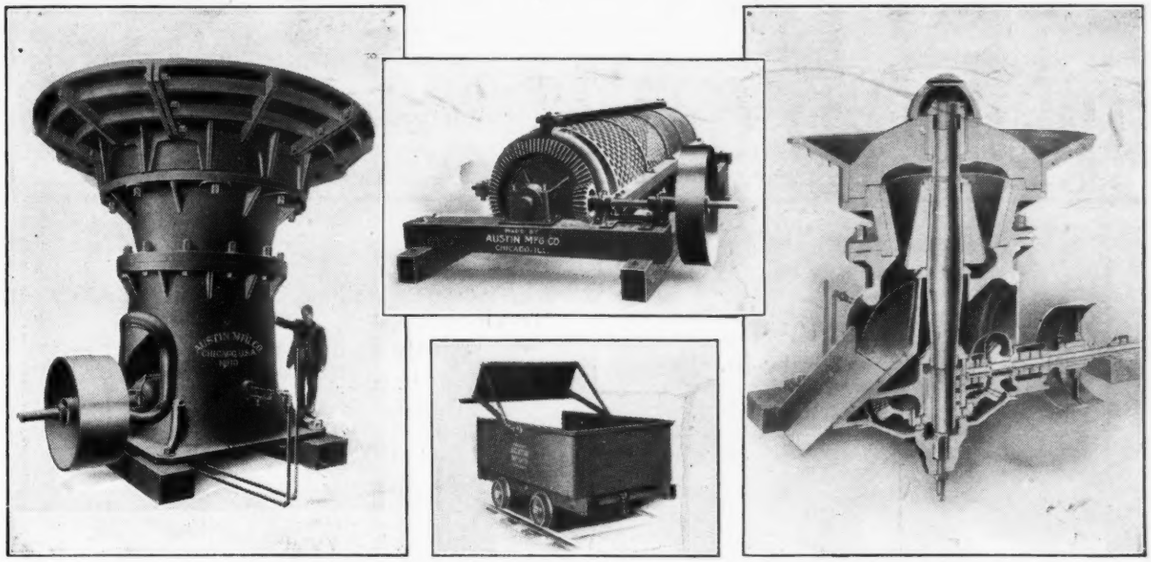
In addition to this a "Browning" may be equipped to handle a drag-line scraper, or fitted with a set of pile-driver leads, a "Browning" will drive piles anywhere within a 24 foot circle with equal ease. It can also be converted into a steam shovel of extreme range and high dump.

Get better acquainted with the "Browning" —write for catalog and actual figures on your line of work.

The Browning Co.
Cleveland, Ohio

SALES OFFICES:
New York Chicago





We Invite You to Look Inside

When we are selling you an Austin Gyratory Crusher, the more you probe into its internal construction, the more surely we feel that you will be convinced of the advantages of AUSTIN DESIGN. Austin gyratory features are substantial mechanical advantages, not merely "talking points."

Austin Gyratory Crushers are built in eight sizes ranging from 5 to 500 tons hourly capacity.

Austin Quarry and Gravel Pit Equipment is the kind that stands up to hard service.

Revolving Screens
Belt and Chain Elevators
Quarry Cars and Hoists, etc., etc.

Austin Manufacturing Co., Chicago

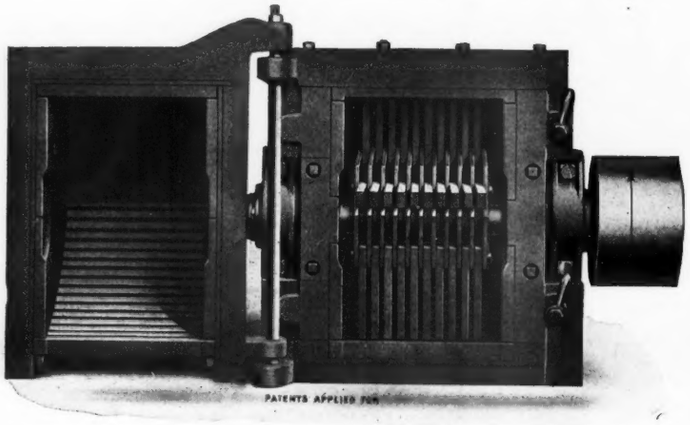
New York **San Francisco**

During the war the United States and Allied Governments purchased over 700 Austin Motor Rollers, more than ten times their combined purchases of all other rollers, and at higher prices.

"ONE MAN – ONE MINUTE"

STURTEVANT "OPEN-DOOR" MACHINERY

"Open-Door" Swing-Sledge Mill



PATENTED

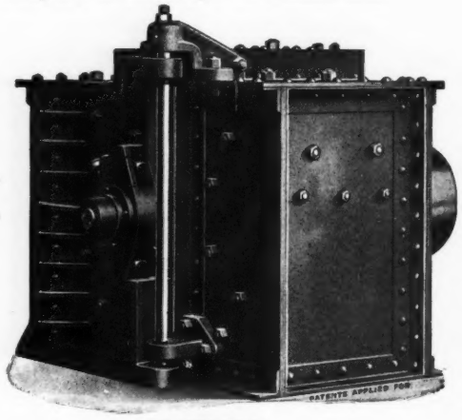
FOR PULVERIZING SOFT AND MODERATELY HARD MATERIALS

"ONE-MAN IN ONE-MINUTE" opens this massive door, through which every part may be reached for inspection, adjustment, repair, or for the removal of iron or other uncrushable substances.

High-speed Pulverizers produce enormous outputs if closely adjusted and kept in repair; otherwise, production falls off rapidly.

To repair other mills of this type is a long and difficult undertaking and therefore is generally neglected, and the mills seldom give rated capacities.

There is no excuse for neglect with "OPEN-DOOR" mills, and therefore their outputs are always at maximum.



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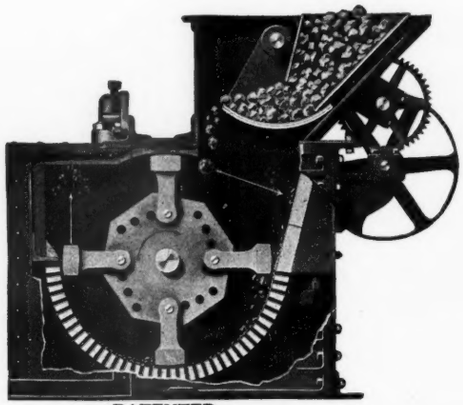


PATENTED

STURTEVANT MILL CO., BOSTON MASS.

HARRISON SQUARE

Prompt attention will be given your inquiry if you mention ROCK PRODUCTS

CYCLONE HOISTS

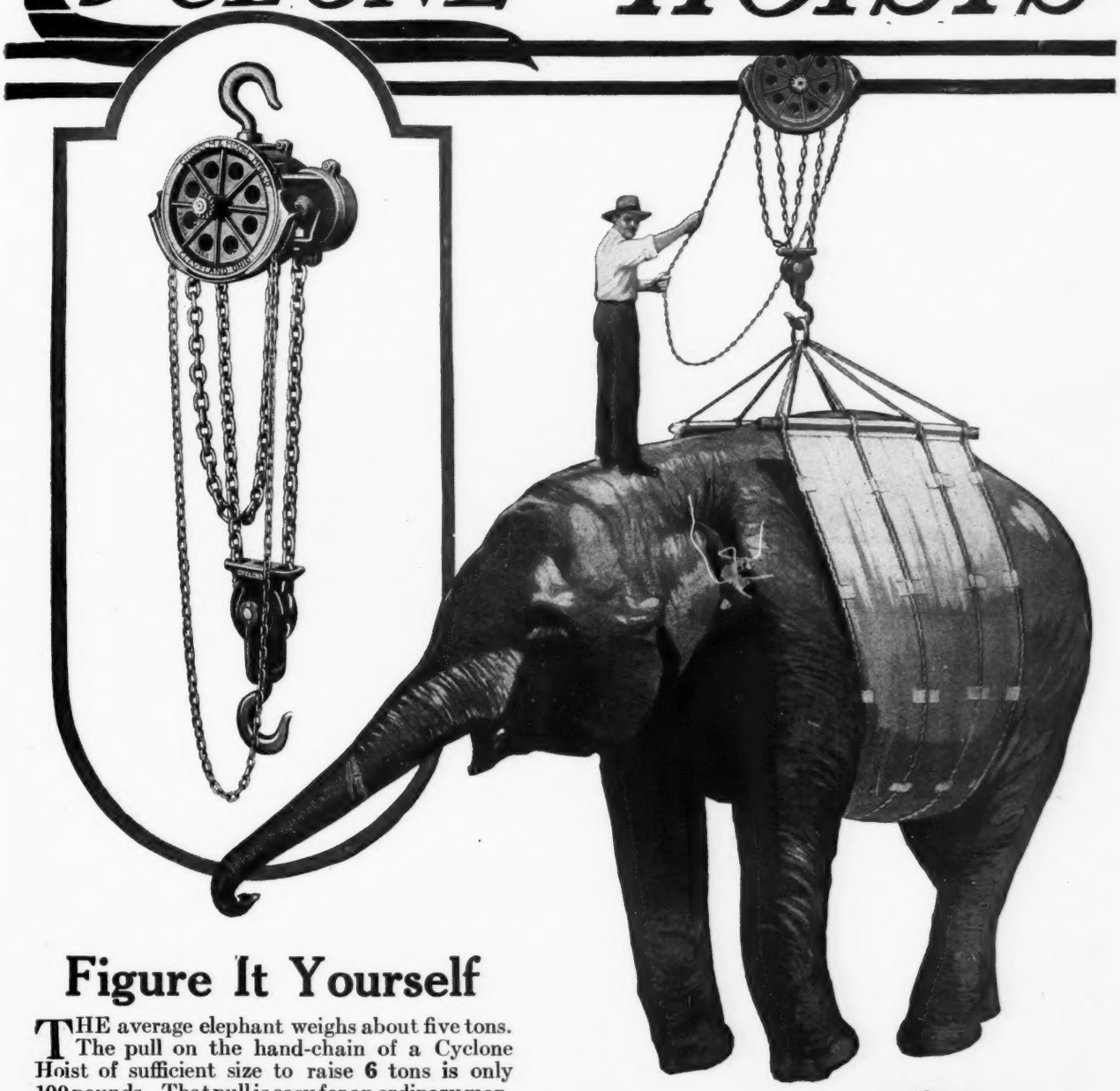


Figure It Yourself

THE average elephant weighs about five tons. The pull on the hand-chain of a Cyclone Hoist of sufficient size to raise **6** tons is only 109 pounds. That pull is easy for an ordinary man.

While it is quite probable that you have never thought of hoisting an elephant, it is also possible that you have never thought of all the places in your plant where Cyclone Hoists could profitably be used.

To get the full details of the dividend-raising Cyclone Hoist write for 96-page catalog today.

The Chisholm-Moore Mfg. Co.
Cleveland. O.

Hoists Cranes Trolleys

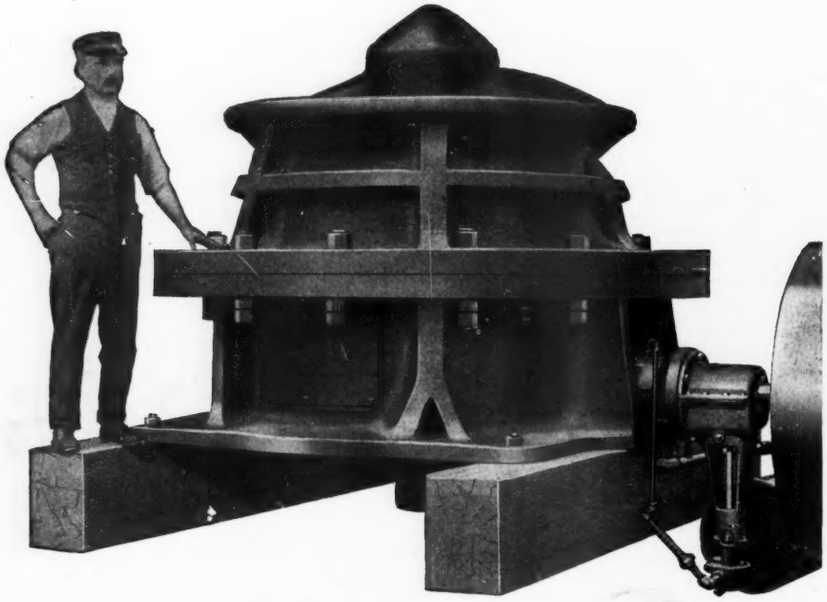
Branch Offices:

New York 30 Church St. | Pittsburgh Henry W. Oliver Bldg. | Chicago Peoples Gas Bldg.

It's Perfectly Possible

This picture was drawn, not with the desire merely to present this bizarre or humorous, but to graphically drive home the possibilities of a Cyclone Hoist.

To say you saw the ad in ROCK PRODUCTS gives tone to your inquiry



ESSENTIALS OF A REDUCTION CRUSHER

The Telsmith Reduction Crusher embodies all the essentials of the ideal re-crusher. Here are the six principal points:

STRUCTURE—As secondary crushing is very difficult work, a sturdy structure is the first and fundamental requirement. **Note the very short, heavily metalled frame and rigid shaft of the Telsmith Reduction Crusher.**

BEARINGS—For the same reasons, the bearings should be ample in area, well lubricated and thoroughly protected. **The eccentric of the Telsmith Reduction Crusher is almost as long as the crusher itself, with a diameter to correspond. Lubrication is by oil under pressure.**

FEED AREA—The feed openings should be ample to permit **gravity** flow of rock into the crusher, without hand or mechanical regulation. **Telsmith will work just as well under a 20-foot head of rock as with the bowl barely full.**

DISCHARGE OPENING—The discharge circle must be big enough in diameter to compensate for reduced width of the opening. **In the Telsmith Reduction Crusher the mean discharge diameter is approximately 1½ times the mean feed diameter, allowing free escape of the crushed rock even when set for the smallest product.**

FLY-WHEEL EFFECT—Discharge should be by gravity, since centrifugal action involves a dangerous accumulation of fly-wheel effect and serious wear on vital parts of the machine. **Telsmith discharges by gravity through a three-arm bottom spider. The only heavy parts in rotation are the eccentric, gears and driving pulley.**

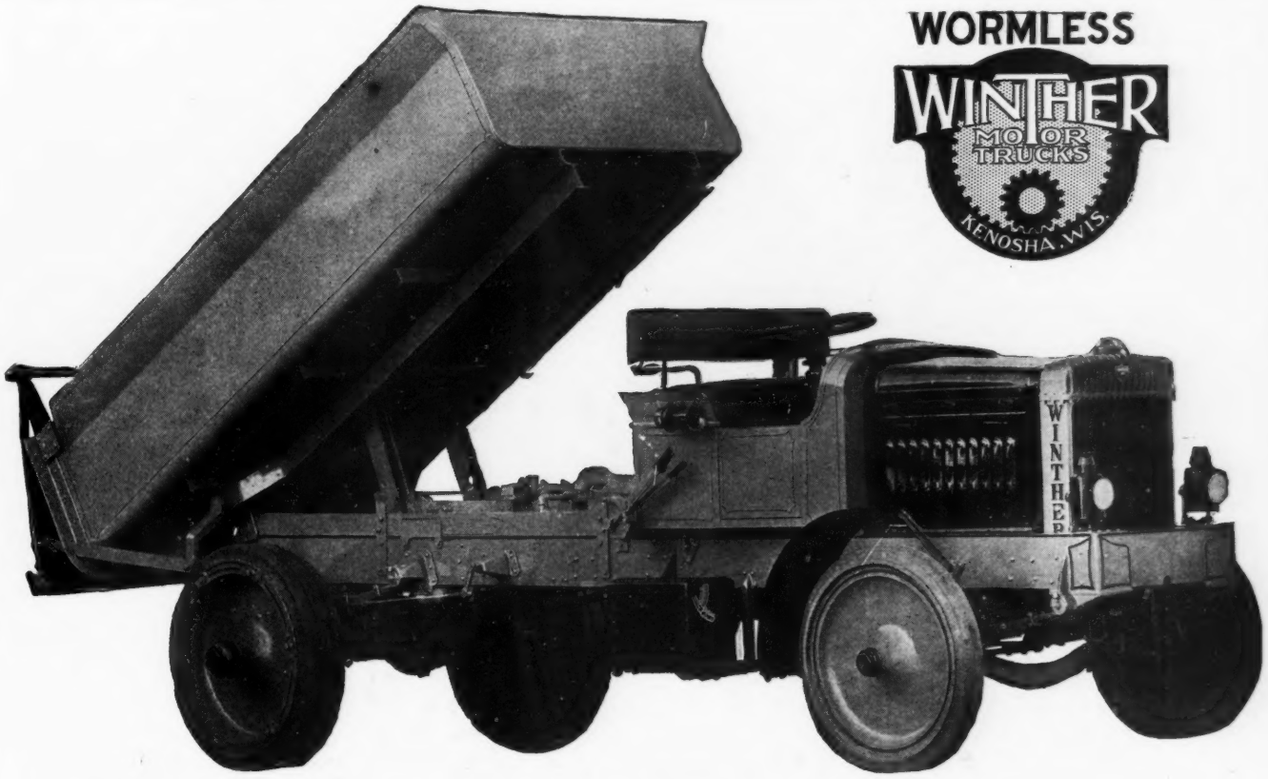
CRUSHING SURFACES—Wearing surfaces should be ample without any concentration of abrasive action. **Telsmith has an enormous crushing head and concave bowl, with wear uniformly distributed by the "creep" of the head.**

If interested in re-crushers send for our Bulletin No. 2-F-11, covering Telsmith Reduction Crusher. Also glad to send you Catalog No. 166, describing Telsmith Primary Breaker.

SMITH ENGINEERING WORKS

3188 Locust Street, Milwaukee, Wis.

545 Old Colony Building, Chicago, Ill.
30 Church Street, New York City
930 Oliver Building, Boston, Mass.
710 Witherspoon Building, Philadelphia, Pa.
Garfield Building, Cleveland, Ohio
523 Boston Building, Denver, Colo.
Road Builders' Eq. Co., Portland, Ore.
Franklin and Channing Aves., St. Louis, Mo.
Salt Lake Hardware Co., Salt Lake City, Utah.



WORMLESS
WINTHER
MOTOR TRUCKS
KENOSHA, WIS.

The Proof of Performance

UNKNOWN five years ago, today Winther admittedly ranks foremost among high grade trucks.

Winther built trucks have come to be known as the concrete worker's truck.

For the simple reason that the concrete contractor, and the whole concrete industry, demands upon any truck are perhaps more severe than any other American business, and that Winther Internal Gear Drive Trucks, both rear and 4 Wheel Drive, are built to withstand usage that would wreck ordinary trucks, it is not difficult to understand Winther popularity.

Winther reputation in the concrete world is based upon just one thing —the performance of the truck itself. What better evidence could there be?

Winther trucks HAVE established new standards of economy; of low cost of upkeep and maintenance; of long life and the utmost day in and day out reliability.

These are facts. We shall be glad to place before you the experiences of their users.

Winther Trucks (Rear Drive) are built in seven sizes—1½ to 7 tons—and Winther-Marwin Trucks (4 Wheel Drive) are built in four sizes —¾-1 ton, 1½ ton, 2½ ton and 3½ ton capacity.

We particularly direct your attention to the smaller sizes. They embody a quality of construction and a range of performance new to trucks of this capacity.

Winther Motor Truck Company

Department 51 **Kenosha, Wisconsin**

AETNA DYNAMITE—of a particular grade that will suit your individual requirements—should be the first point to turn to on your dial of blasting problems, because it is so made as to represent, figuratively, when properly loaded, the right "tumbler" in your locked-up strata. And, Aetna Dynamites differ essentially from most brands in that they produce less fumes.

Turning to "Lion" Electric Blasting Caps, they contain a Fulminate of Mercury charge, which makes them the most dependable and efficient detonator known. We direct your attention to the .30 calibre diameter of "Lion" Electric Blasting Caps. The advantage of this diameter shell is that it gives the maximum concentration of charge, which is of vital importance. If a smaller diameter shell is used the same sized charge would be proportionately longer, and instead of a powerful blow being delivered upon a small area—such as our .30 calibre shell gives—there would be a diminished one over an extended area, with the possibility of imperfect detonation.

Then turning to Proper Loading, we find a point that is often out of true in general practice. We will mention here only one instance: We have known of blasters who have put an Electric Blasting Cap with a four-foot lead in a hole twenty feet deep and then attached light connecting wire to it because it is cheaper than the longer wires of a twenty-foot Electric Blasting Cap which are made to withstand a greater pressure. No matter how carefully a joint is made, there is more resistance to the firing current in a joint than there is in solid wire. This idea—and we have seen it used many times—is a mighty expensive attempt at economy. Proper loading, from the first stick of dynamite to the top of the tamping, and the making of proper connections, is all important.

Finishing up the combination with a "Lion" Blasting Machine, we have in it a powerful dynamo, simply constructed, yet in such a way, and of such materials, that it withstands hard usage and comes as near taking care of itself as any machine can.

AETNA EXPLOSIVES COMPANY, Inc.

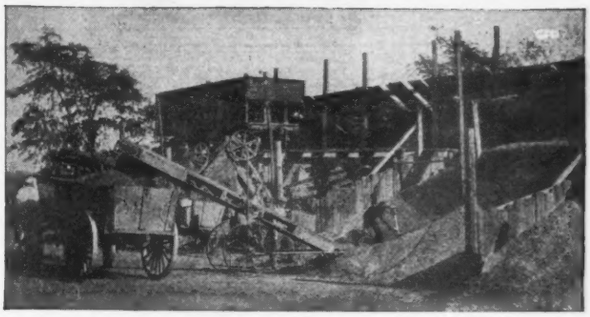
NEW YORK CITY

BRANCH OFFICES:

Birmingham, Ala.
Buffalo, N. Y.
Chicago, Ill.
Denver, Colo.
Duluth, Minn.
Joplin, Mo.
Louisville, Ky.
New Orleans, La.
Norristown, Pa.
Pittsburgh, Pa.
Pottsville, Pa.
Roanoke, Va.
St. Louis, Mo.
Wilkes Barre, Pa.

To say you saw the ad in ROCK PRODUCTS gives tone to your inquiry

THE SCOOP

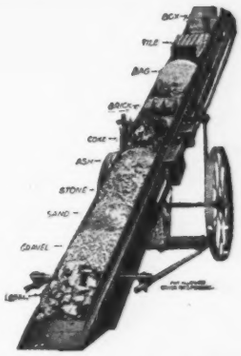


THE SCOOP CONVEYOR DOES THE WORK OF FROM

6 to 12 Men

AND KEEPS EQUIPMENT MOVING

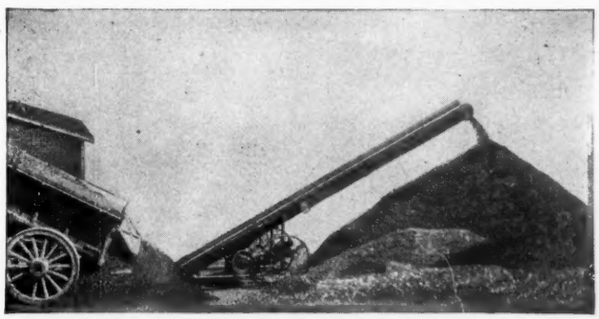
HANDLES COAL, COKE, ASHES, SAND, GRAVEL, EARTH, ETC.



OVER 1000 IN USE by leading manufacturing plants, contractors, coal dealers, etc., for storing and reclaiming, loading and unloading cars, trucks and wagons.

Write for Literature

PORTABLE MACHINERY CO., Inc., PASSAIC, N. J.



CONVEYOR

SYMONS DISC CRUSHER

"The Master Crusher"

"Good Roads!"—

—the slogan of every progressive State in the Union—will become a reality now that after-war conditions will permit the direction of labor towards road construction.

Think of the increasing demands that will be made for crushed rock and gravel!

Are you prepared to gain your share of the profits that will come with this new era of prosperity? Is your plant ready for capacity production?

Symons Disc Crushers will make your plant 100% efficient. It will pay you to investigate why it is the favorite of the most experienced producers. Write for descriptive catalog today!

CHALMERS & WILLIAMS
1425 Arnold Street Chicago Heights, Illinois

Record of a 48-in. Crusher in the Field

Material Crushed, Limestone

Length of time operated, 3 yrs.

Size of Feed, 4".

Size of Product, 1½".

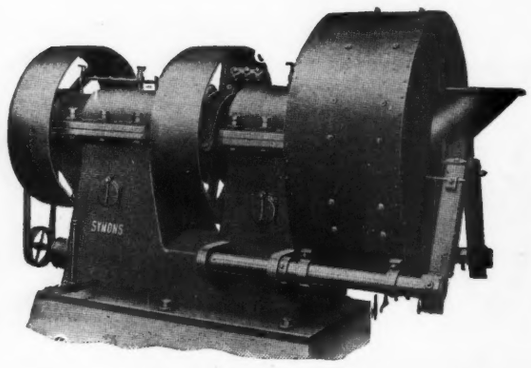
Horsepower used, 65.

Tons per hour, 80 to 100.

Tons crushed per set of discs, 750,000.

No lost time on account of breakage.

We also build them in 18" and 36" size.



Record of a 24-in. Crusher in the Field

Material Crushed, Gravel and Hard Heads.

Length of time operated, 2 yrs.

Size of Feed, 2".

Size of Product, ½".

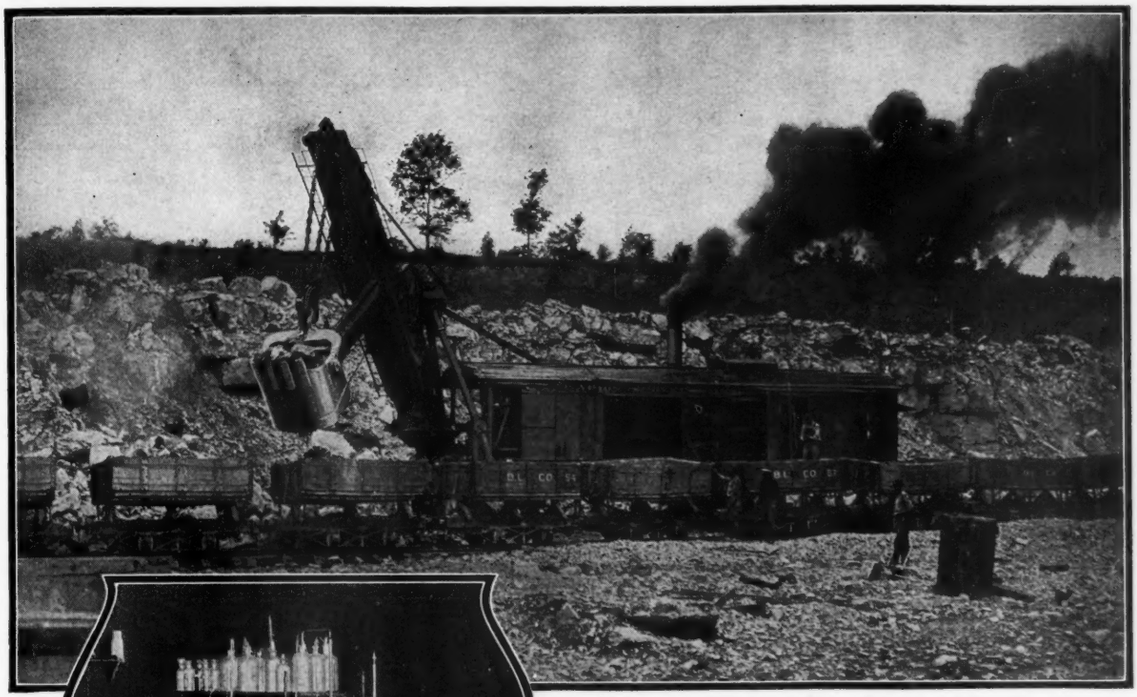
Horsepower used, 20.

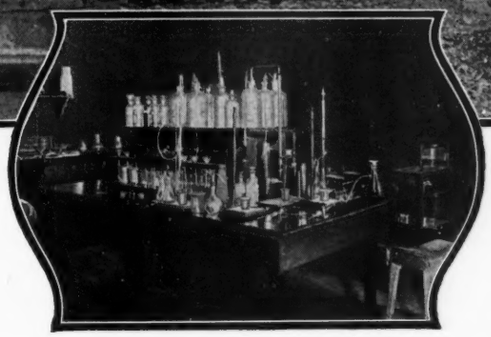
Tons crushed per hour, 25.

Original crushing discs still in use.

No lost time account breakage.

Superior to Rolls, Jaw or Gyratory Crushers on this class of work.





"The acid test" has a real meaning at the "Marion" plant. Here is a corner—just a corner—of our Chemical Laboratory, where careful analysis is made of all the materials that go into "Marion" equipment.

A Cut "Five Stories Deep"

They go deep on the property of the Bessemer Limestone Co., Youngstown, Ohio, and Bessemer, Pa. First, through an overburden of top-soil; then a vein of good coal; next a thick bed of fire-clay; after that a heavy course of brick-making shale; and fifth, a deep stratum of commercial limestone.

Five "Marion" Shovels owned by this corporation are doing the work—doing it with an efficiency, economy and a businesslike precision that has quite won the owners' hearts.

"Marion" service on this particular operation is a good index of the work hundreds of other "Marions" are doing on important jobs, the world over. It explains why "Marions" get the call when the demand is for maximum capacity and endurance under a steady, hard, day-after-day grind.

"Marions" will do *your* work—will *see it through.* We shall be pleased to send particulars.

THE MARION STEAM SHOVEL COMPANY

Established 1884 Marion, Ohio

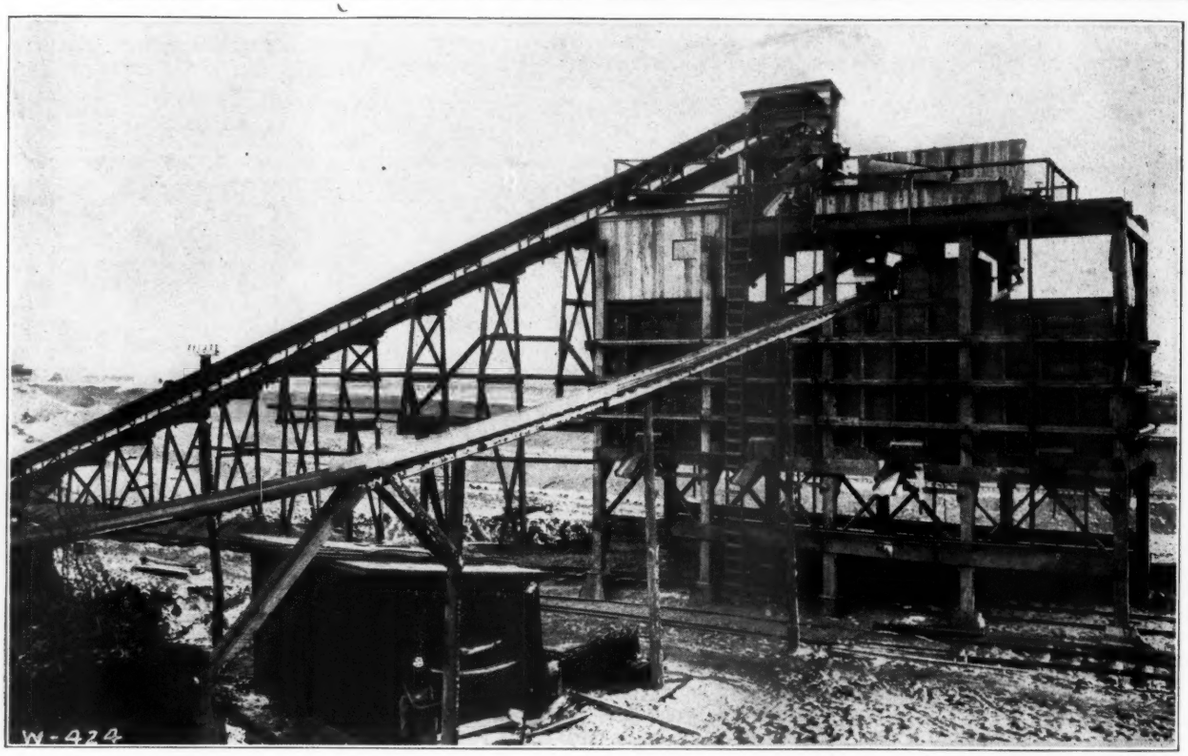
CHICAGO NEW YORK SAN FRANCISCO

Marion

You will get entire satisfaction if you mention ROCK PRODUCTS

WEBSTER Sand and Gravel Plant Machinery

also Conveying and Elevating Equipment for all large operations

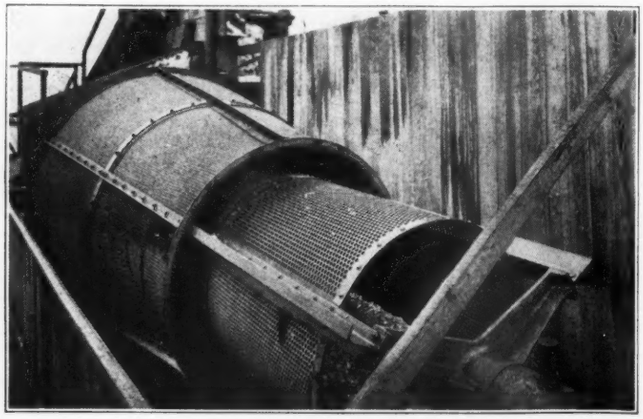


When you buy Webster Machinery you get two vital things:

1—The benefit of an engineering staff that is particularly skilled in planning economical and productive plants.

2—Dependable machinery. Webster Machinery cuts costs, saves labor and increases production.

Explain your requirements and receive the benefit of the experience of an organization that has successfully served big operators for over 40 years.



The large illustration shows a Webster Cyl-Cone Sand and Gravel Washing Plant at Ludlow, Ky., owned by Ideal Supplies Company.

The Webster Cyl-Cone Screen, shown at left, permits a particularly economical arrangement and construction for a plant to make three or more size separations

(270)

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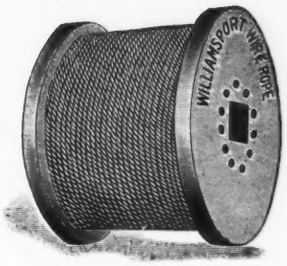

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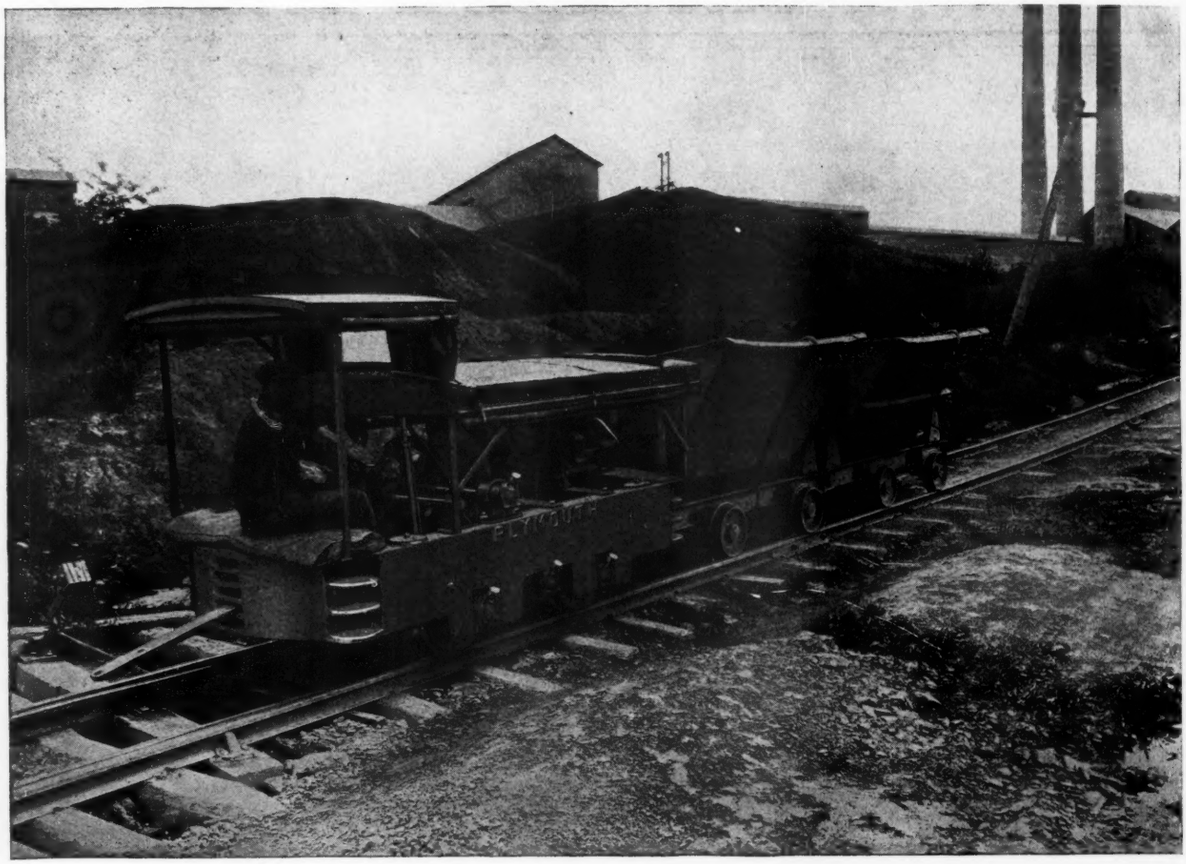

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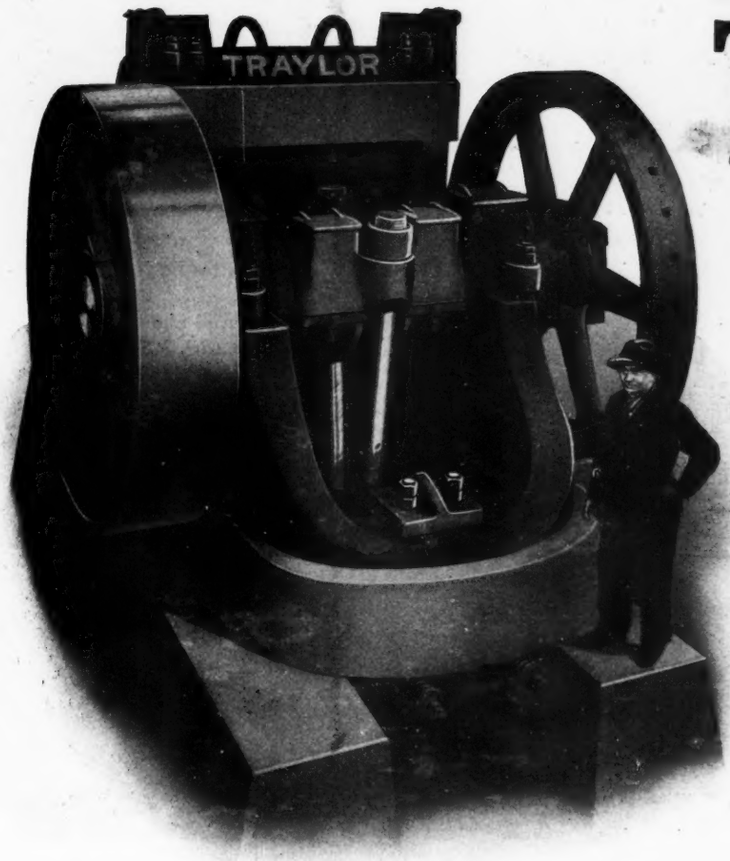

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The "Bulldog" Pitman

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You'll see

The "Bulldog"

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You'll see why Traylor "Bulldog" Jaw Crushers have cut out 80% of the friction load of the Blake type crushers.

Bulletin RJX-1
fully describes these and other features of the Bulldogs. You ought to have one for reference.

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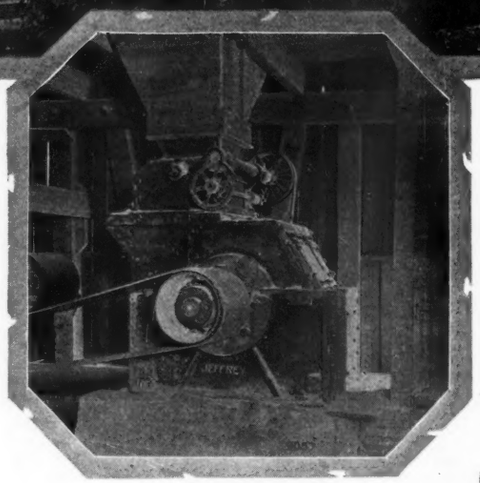

Type "D" Limestone Pulverizer at the plant of the Clinchfield Lime Co., of Asheville, North Carolina

The pulverized stone from this quarry is used for sweetening the soil throughout the south Atlantic States

In addition to the Jeffrey Pulverizer illustrated, the limestone plant pictured above is equipped throughout with Jeffrey Elevators, Conveyors and Screens

Jeffrey Type "D" Ball Bearing Pulverizers

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The advertiser wants to know that you saw his ad in ROCK PRODUCTS

Rock Products

Vol. XXII Chicago, September 13, 1919 No. 19

Production and the Labor Problem

Shortage of Common Labor, Shorter Working Day and Decreased Production Per Capita Becoming Most Serious Problem of Rock Products Industry—Immigration Should Not Be Restricted

REPORTS REACHING ROCK PRODUCTS daily show that the industry nearly everywhere is as near the limit of maximum production as labor and railway conditions permit. The railway car shortage problem, it is to be hoped, is a temporary condition. The labor shortage problem, on the other hand, threatens to be most serious, and in all probability will become worse in another season rather than better.

Our country is fortunate in that the labor shortage is not in any appreciable amount caused by actual war losses of its citizens in dead and maimed. Nor is it due so much to the departure of alien workers as has been believed. The departures in round numbers amount to practically no more than would have occurred in normal times, had they been spread over the last three or four years.

The real key of the problem is not in the *exodus,* serious as it may look for the moment, but in the falling off of *immigration.* In the two years before the war the arrivals exceeded the departures by about 700,000 per annum. Had this immigration continued as it normally would have done except for the war, our present population would have been increased by 3,500,000.

Considering every one in four of those coming as able-bodied male laborers, and it is easy to see that we are about 1,000,000 laborers short for normal operation of our industries, just from a falling off of immigration. Higher wages and shorter hours have made the situation harder, for in many industries increased production in a shorter time is not possible. The railways, for instance, although rendering less service than in pre-war days, employ many thousands more men than previously.

It is proposed now to restrict immigration in the interests of American labor; but such a course is certainly of very questionable value to real American laborers. They in the main are skilled workmen, whose employment depends directly on the production of requisite raw materials; and for the production of these raw materials it has not been possible in the past to find any but foreign-born laborers.

It is not a far guess that a good many of Europe's inhabitants will tire of living under the conditions of anarchy and turmoil that are likely to prevail there for some years to come. And if the bars were let down to them many of the soberest and the most desirable as prospective citizens would seek an asylum here and be glad to do any honest work.

Certainly this is the simplest present solution of the problem, and therefore employers of common labor are opposing, and ought to oppose, the attempt of Congress to bring about a stagnation of the construction industries by cutting off immigration. Eventually, for the happy solution of this great problem, it is to be hoped, we will be able to so educate and treat our own fellow citizens that no honest work will be despised by them, even if it does make their hands calloused. But that will take time and experience with Industrial Democracy, or some other method in which the spirit of toleration and mutual respect are the guiding stars.

How Industrial Democracy Works

Head of Large Concern Where Plan Has Long Operated Tells of Results

THE LARGEST EMPLOYERS IN AMERICA are eager for the fullest information on the actual, practical experiences of companies which have put into operation the Industrial Democracy plan devised by John Leitch. All sorts of questions are being asked by concerns which feel that they may, if the thing checks up satisfactorily, seriously consider adopting the plan. This article, written by the head of the largest tobacco pipe plant in the world (Leipold Demuth, President Wm. Demuth & Co.) where Industrial Democracy has been in force for two years, gives brief, specific replies to the questions most frequently asked. Mr. Demuth remarked to the editor that, in addition to all that he had here set down, Industrial Democracy had done something else: It had made a broader and better man of him.
—B. C. Forbes.

THE CONSTANTLY INCREASING inquiries from leaders in various lines of business throughout the country evidences the growing public interest in the plan of Industrial Democracy at the Demuth plant. These inquiries include requests for a brief description of our community of interest plan and of our experience with it. They can perhaps best be answered in a general way for the benefit of American manufacturers and employees by taking up a few of the different questions generally asked.

Is the plan still an experiment or has it been satisfactorily worked out?

It has been in operation for two years, and while we are continually making minor improvements in our organization, nevertheless we have actually tested the plan under circumstances which leave no doubt in our minds as to its success.

What is the central idea?

It is a system of self-government modeled upon our own Federal Constitution and National Government by which our nine hundred men and women employees at Richmond Hill, New York, have a voice in the running of the plant.

Just what is the system of representation?

The representation follows closely upon the lines of our own National Government. There is a Cabinet, a Senate and House of Representatives. The Cabinet and Senate are not elective bodies; the members of these bodies hold their places by virtue of their positions in the business. The Cabinet is composed of the executives of the company and the Senate of the foremen and heads of departments.

The House of Representatives, as in the case of the administration at Washington, is the popular body. It is elected by secret ballot by the whole body of workers. There is approximately one representative for every thirty workers, and each department is represented. The only qualifications placed upon the men or women elected are that they speak and understand the English language, that they shall have been in our employ for at least one year, and that they be "on the level."

What is the method of procedure of transacting the business of the firm in connection with the House and the Senate?

As in the case of our National Government, rules have been established by which the House and the Senate do their business. Meetings are held once a week by each body separately. Each body elects its own officers and appoints standing committees to which are referred all prospective legislation. When these committees make their report, the subject in question is thoroughly and openly discussed, and if any legislation has been passed or recommendations made, the matter is brought to the next body for its action.

Naturally, to become a law, a bill must first pass both the House and the Senate and also receive executive approval.

What happens when the House and Senate pass a bill and it is disapproved by the Cabinet?

No such situation has yet arisen in our two years' experience. The Cabinet has the power to veto, but to this date has never exercised this power, there having been no need for it.

What are the Representatives' duties?

The Representatives in the lower House act as counsellors within their departments. They receive and transmit to the House all suggestions and complaints, and they are also responsible for keeping their fellow-workers informed as to what takes place at the weekly sessions of the House.

How can legislation be initiated except by being introduced by a member of the House?

The Cabinet can initiate legislation by means of a message to the Senate or the lower House and the same opportunity is open to the Senate.

How is Industrial Democracy installed?

The Industrial Democracy plan was brought to the attention of the firm and employees by John Leitch, a business engineer of Philadelphia, who, at a series of general mass meetings attended by the members of the firm as well as by the employees themselves, discussed the necessary foundation stones of a new business policy, starting with Justice, Co-operation, and taking in Economy and Energy, with the final keynote of Service. After accepting this business policy as a guide for our work and actions, we started to govern ourselves under this new dispensation with the understanding that all rules and regulations affecting the employee were to be in the hands of the legislature subject to the confirmation of the Cabinet.

Did you have any trouble in introducing the plan?

Frankly, at the outset, some of the workers received the idea rather coldly; others viewed it with more or less suspicion. The interest of all was aroused, however, when presently it was explained to them that if, by reason of any co-operation induced by this plan, there was a saving in the cost of production, such saving, whether in overhead or because of larger production, would be divided equally between the company and the workers. And when at the end of two weeks we were able to declare a 6½ per cent dividend and thus give them concrete evidence of our sincerity, they warmed up to the idea and were enthusiastic in their endeavors to make the experiment a success.

Was the plan introduced because of the fear that labor trouble was imminent?

Emphatically no. We have had no labor trouble in our business for many years and did not fear any at the time we started this plan. It seemed to us the wise and liberal, as well as a paying policy. We had been established for over fifty years, and when the growth of our business made intimate relationship between the employer and employee impossible, we realized that only through giving the worker his say in the running of the plant could we get the co-operation so urgently needed to further promote business. Before then the labor leader had been the only teacher of the workingman and we knew it would pay us to endeavor to educate him in a way

that would teach him the value of co-operation.

Do you believe any profit sharing plan would produce the same results?

We believe that profit sharing is one method, and ours, based upon actual performance of the worker, is another. The profit sharing plan has many worthy features, but we do not believe that many workmen understand the inevitable variation of the percentage of profit. Furthermore, we do not believe that he should be made to suffer for any losses connected with sales, finances or raw merchandise investments, all of which are beyond his control. Our plan is based upon a saving accomplished by the worker in both production as well as overhead. Furthermore, under our plan whereby we give our employee his dividend every two weeks—incidentally in a separate envelope marked "Employee's Dividend"—he does not have to wait for what seems to him the indefinite future to learn whether or not the employer is living up to his promises. He can watch his dividend grow larger or smaller, and soon he will begin to learn that when every machine is running all the time he makes more money than when his fellow workers take holidays and machines are left idle. Thus he comes to know that co-operation means a larger pay envelope.

Is Industrial Democracy suitable to any business?

Of course, every business has its own individual problems and no system laid down will be universally applicable. But it is our opinion that the principles can be made to fit in any organization employing labor to any extent.

Has not Industrial Democracy undermined your authority, the authority of the employer?

No. It has not in the slightest impaired the authority of the employer. On the contrary that authority has been strengthened by reason of the fact that no important action is taken without the approval of the employees through their Representatives, and today in our plant any one inclined to be troublesome must reckon with the force of the opinion of his fellow workers, which is a most powerful factor.

What effect, if any, has the plan had on the labor turnover?

As a result of our Industrial Democracy our labor turnover has gone down to a point where it is not a serious factor with us. During the height of the war, when high wages in the ammunition plants were tempting workers, and our neighboring manufacturers were feeling the shortage of labor, we fortunately had the interest of the men themselves in this problem. Knowing that lack of help would reduce their dividends, our employees saw to it that their fellow-workers stayed with them, and their friends were brought in to fill any vacancies.

What effect has your Industrial Democracy had on the cost of production?

Frankly, we can not say specifically whether or not Industrial Democracy has reduced the costs of production during the last two years; our costs have risen, as we expected they would, due to the same conditions which affected every one else. We did not in the beginning have any illusion that Industrial Democracy would keep our costs down to pre-war basis. How much lower they have been than would have been the case if we had not had Industrial Democracy is largely a matter of speculation. We honestly feel that we have benefited distinctly from this point of view. We are convinced that under the old system, the difficulties with employees suffered by many other firms, would have increased costs far beyond the point to which they did rise.

What is the biggest and most difficult task in the installation of Industrial Democracy?

The biggest and most difficult task in the installation of this plan is establishing confidence between worker and executive. Without the co-operation of the whole body of workers, the idea must fail, but our experience has been that when employees are once convinced of the company's sincerity this co-operation is given wholeheartedly. Our dividend system, whereby the workers receive bi-weekly additions to their regular pay, is a powerful factor in gaining this confidence.

Are you able to give an example of how any one move suggested by the employers has reacted to the benefit of the firm itself?

Yes. Take the question of hours of employment. We were working fifty-three hours a week. At one of the meetings of the lower House, it was suggested that the working hours be reduced to fifty without a loss of production and a certain saving in overhead. The subject was argued from every possible angle. Finally, all three bodies came to the conclusion that they would try it out. If the experiment resulted in any loss of production, the workers agreed to go back to the fifty-three hour week. Every one pledged himself to a full, honest fifty-hour service, promising to avoid tardiness and idle machinery. Before the trial period was over the production was increased by about 8 per cent, which meant better income and saving for all concerned. A few months ago the Cabinet suggested to the men that as long as the first change of hours worked out so successfully, the House and Senate should consider the advisability of changing to a forty-eight hour week. After quite some deliberation, the new schedule was accepted, and we are now working forty-eight hours without having decreased the production.

What effect has the community of interest idea had upon quality production?

Many of our men are piece workers. Some were in the habit of rushing their work so that they could make the most money regardless of the quality of their output. At the meetings of the lower House, the Representatives of the workers learned that this policy was lowering their dividends, for it was resulting in a great many seconds and thirds, and a large amount of waste. The Representatives brought home this fact to the workers, who began to realize that any gain made by rushing their work was more than offset by the loss in dividends caused by this method. Consequently, they soon began to turn out better pipes.

Another important factor in raising the standard of quality is that, by reason of his having a voice in the management of the plant, the worker takes more pride in the product, as in the case of the craftsmen of old.

Can you give an instance of how the community of interest idea has added or is aiding in the work of Americanization?

Yes. We had many foreigners in our factory. The House of Representatives brought forth the point that the inability of many men and women to understand English was a handicap to the business in that they sometimes misunderstood what was told them. So in connection with the Board of Education of New York City, they established English-speaking classes. There again we applied our 50-50 principle, as time spent in these classes is one-half company time and one-half employee's time. Besides the English language, we are teaching the first principles of Americanism. We point with pride to a record of ninety-five applications for citizenship papers which our employment manager filled out a few weeks ago.

Name one of the important results, if not the important result, of the community of interest idea.

From the human standpoint the most pronounced and satisfactory result—the one thing more than any other that has made it seem worth while—is that our Community of Interest Idea has helped to make better men and women. It has increased their self-respect, for they feel that they are now being treated not as "hands" but as men and women. Consequently, one and all take pride in their labor and pride in their product. Naturally, too, our Community of Interest Idea has made life more worth the living, in that employees, and ourselves as employers, now occupy the most happy relationship to each other. From the business point of view solely, the Community Idea has developed a new and remarkable teamwork throughout our whole organization.

(Copyright, B. C. Forbes.)

Barge Unloading Devices of Missouri Sand and Gravel Producers

Various Types of Derricks and Travelers Using Clamshell Buckets Handle Material from River Barge to Plant or Stock Pile

MISSOURI IS LARGELY a State of many small sand and gravel producers. Large scale operations are confined to districts within shipping radius of the principal cities, where the material is used chiefly in pavement and building construction. The State has never embarked on an extensive hard-road building program.

Creek sand and gravel are secured at many points by loading by hand and hauling by team. Every little stream has its sand or gravel bar and in numerous instances there are communities with no regular producers or dealers, for any one wanting the material in small quantities goes to the stream and digs it for himself.

Derrick hoist, Osage River Gravel Co., Osage River, Cole County

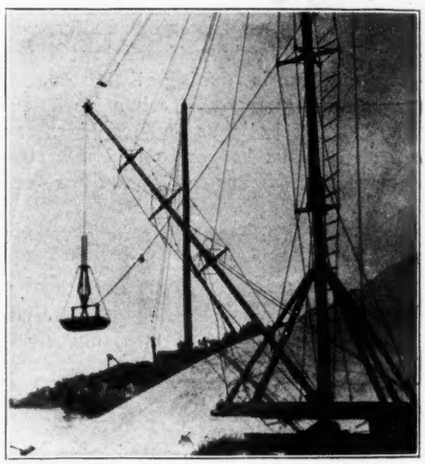
Most of the large producers operate on the Mississippi and Missouri rivers, using suction dredges and loading the material on barges or scows alongside. These are towed to their shore plants and unloaded by various mechanical devices.

The simplest device used is an ordinary home-made stiff-leg derrick, like that shown in the accompanying view. This is easily erected and requires only a boiler and hoisting engine for operation. The next refinement in unloading apparatus is a revolving derrick, which, of course, gives a greater radius for storing the material.

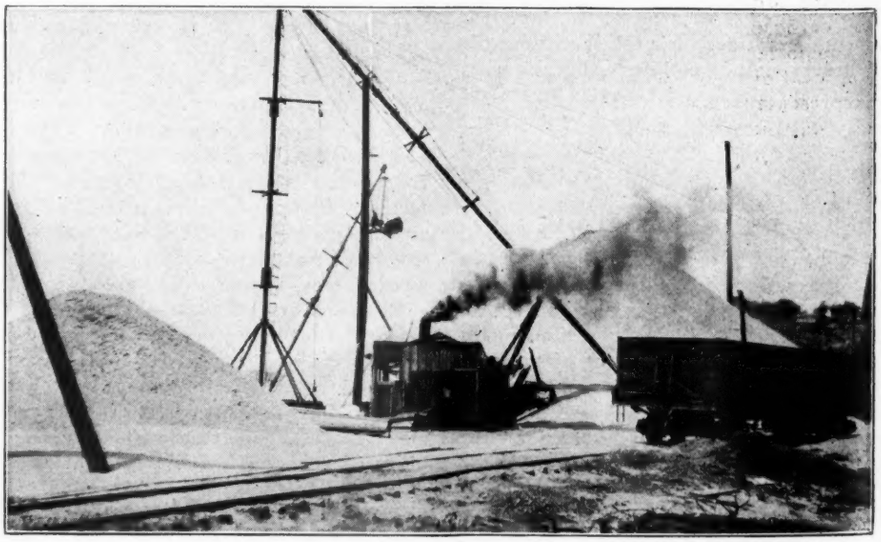
The receptacle for picking up the sand and gravel in the simplest installations is a box skip holding about 1 cu. yd. The derrick mast is so inclined that while the loaded box is being hoisted, the boom swings around by gravity to its unloading position. The box skip is, of course, loaded and dumped by hand labor.

With the more elaborate unloaders the use of clamshell buckets is quite universal. These vary somewhat in detail, but in its essential parts a bucket consists of two halves resembling the two parts of an ordinary clamshell. At the top these are hinged to a heavy steel bar, and are so mounted that when hanging free the shells are open. The weight of the shell is so great that it sinks readily into the sand or gravel, and the lifting cables are so applied that the first strain causes them to close the bucket before it is lifted. The buckets vary in capacity from 1 to 5 yards.

While all clamshells are essentially alike in operation, the method of handling them varies widely. At some plants the bucket is operated by a mast and swinging derrick in such a way that the sand



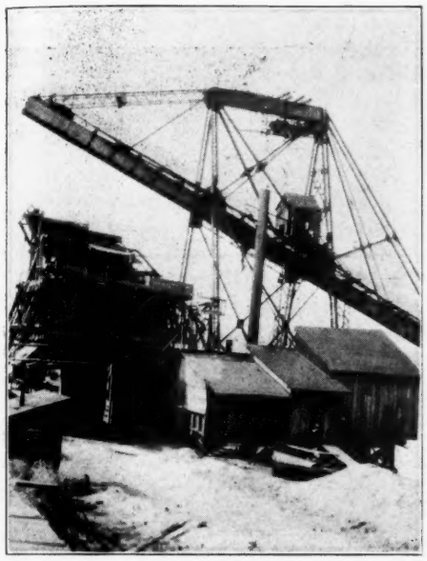
Swinging derrick at St. Joseph



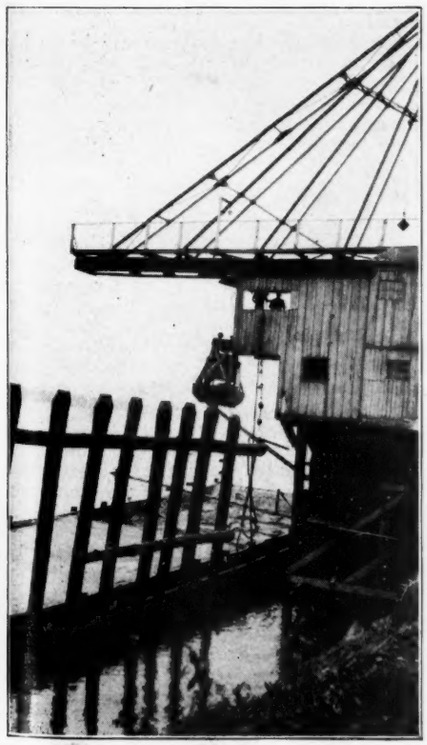
Swinging derrick and clamshell of the Pioneer Sand Co., St. Joseph

can be dumped either directly into the cars or on to a stock pile from which it can be reloaded by the bucket into the cars. Plants of this type operate at St. Joseph, Glasgow, Boonville, and Jefferson City, on Missouri River. At other places the bucket, suspended from a pulley carrier, travels on a railway track. The Union Sand and Material Co.'s plant at Hannibal is of this latter type, and the bucket delivers directly to the screening tower.

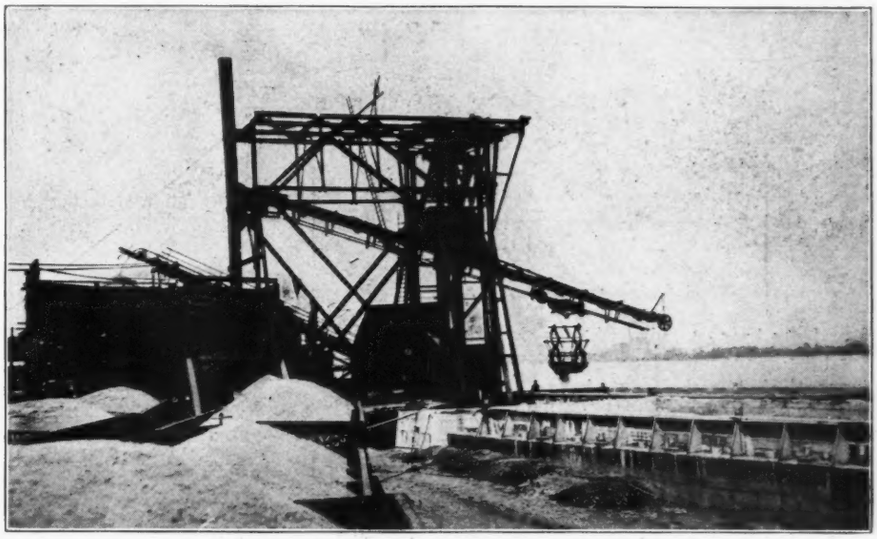
The sand may be delivered directly from barge to car or to stock pile. If the latter, the pile is so placed that the bucket can again deliver from the pile to the car. In this type, the railroad track usually passes between the tower and the stock pile, the carrier track being long enough to reach across the railroad



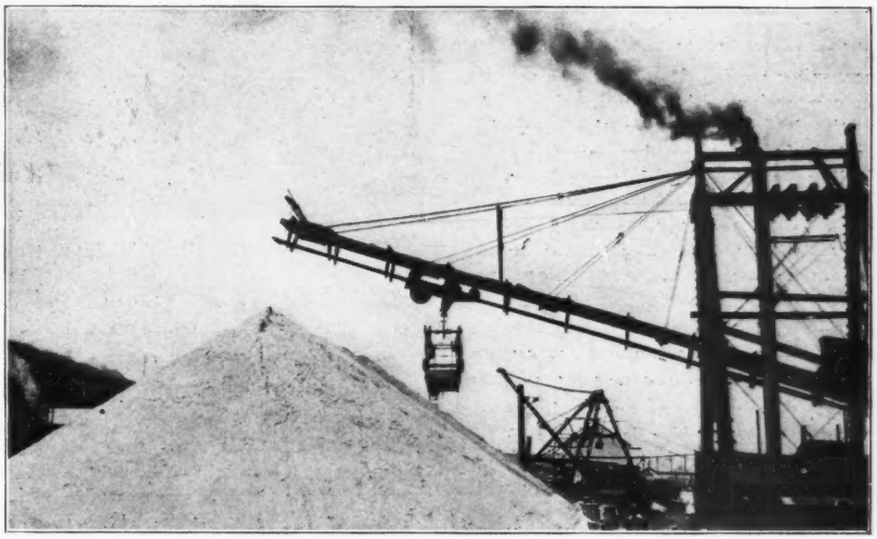
Plant of the Union Sand and Materials Co., Hannibal, on the Mississippi River



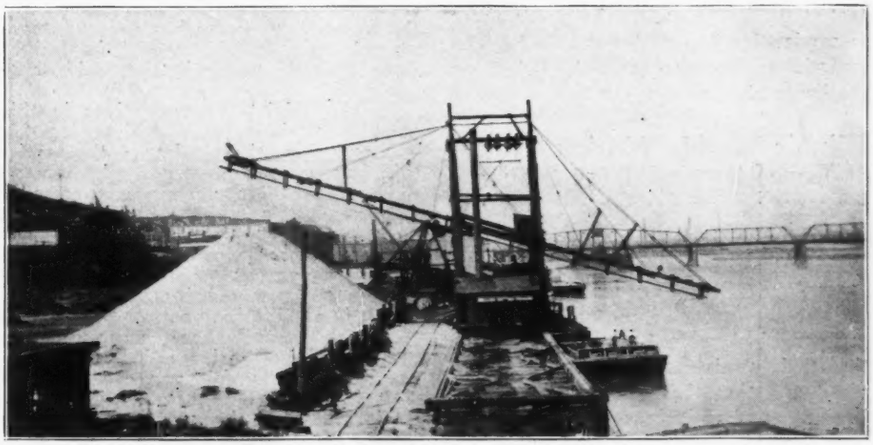
Plant of the Meramec Portland Cement and Materials Co., St. Louis, Mo.



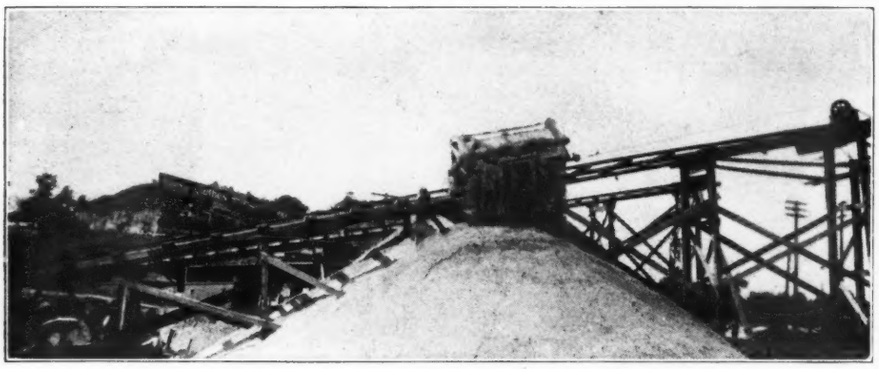
Plant of the Union Sand and Materials Co., St. Louis, Mo., showing clamsheli and traveler arrangement



Combination of clamshell and traveler used by Stewart Sand Co.



Plant of the Stewart Sand Co., Kansas City, Mo., showing traveling unloader for making long stock pile



Automatic electric car unloader at St. Joseph

spur from barge to pile. At the Stewart Sand Co. plant in Kansas City, the tower supporting the carrier track and bucket runs on trucks on a track parallel to the river, like a bridge erection traveler. By this means, the whole tower can be shifted, giving a much larger area for stock piling within reach of the bucket.

At other plants, especially where the sand or gravel is screened and washed, the bucket delivers to a hopper which drops the sand slowly onto an endless belt conveyor. This in turn delivers it either to the loading hopper or to the screening tower. Belt elevators are used in connection with the unloading bucket at the St. Louis plants on the Mississippi, and at the plants at Sherman, Drake and Valley Park on the Meramec River.

The Buchanan Sand and Gravel Co.'s plant at St. Joseph is equipped with an inclined track and an automatically-operated electric dump car. The lower part of the track is operated like a drawbridge. After the track is lowered onto the barge by gravity the car is filled by hand shoveling and then hauled up the incline and dumped automaticaly by electric power. The Morrison Ice and Fuel Co. at Cape Giradeau also unloads from barges by automatic dump cars, operated by cables, however, instead of by an electric third rail.

Plants at Poplar Bluff and Louisiana use belt conveyors which are loaded direct at the barge and discharge on shore to car-loading hoppers or stock pile. The material is shoveled upon the belt from the barges by hand.

Illinois Marble Workers Want More Pay and Less Hours

THIRTY-FIVE MARBLE CUTTERS employed by the Nelson Marble Works at Edwardsville, Ill., following the example of St. Louis marble workers, walked out on strike recently, after the company had refused to grant demands that their newly-formed union be recognized and that they be given an eight-hour day and an increase in pay amounting to approximately 33 per cent. The management of the company offered to treat with the men.

Convention of Mississippi Valley Sand and Gravel Producers

THERE WILL BE a general convention of all sand and gravel producers in the Mississippi Valley States at St. Louis, September 23, under the auspices of the National Association of Sand and Gravel Producers.

Type of clamshell bucket generally used at Missouri plants

Iowa Sand and Gravel Producers' Association Protests Against Freight Increases

R. C. FLETCHER, PRESIDENT of the Iowa Sand and Gravel Producers' Association, has written the following letter to the Director General of Railroads:

Dear Sir: If the press reports and suggestions from many sources in different parts of the country are to be accepted at their face value, a vigorous campaign seems to be in progress for the purpose of increasing railroad revenues by a general increase in freight rates, possibly to the extent of 15 or 20 per cent.

As the official representatives in this state of an industry which, during the war and since the signing of the armistice, has suffered more severely perhaps than most others, permit us to remind you that by General Order No. 28 rates on our products were arbitrarily raised last year from 25 to 150 per cent, with an average increase of about 55 per cent; while other commodities, including slag, which is a direct competitor of our materials, were advanced approximately but 25 per cent; ratios of increase which are manifestly unfair and especially so if it be remembered that, while absolutely essential in most construction work, sand and gravel are not only among the lowest priced commodities moving by rail but in very many cases existing freight rates on them are already greater than the price of the materials f. o. b. points of origin.

Respectfully but most earnestly on behalf of our industry and for reasons given in the foregoing paragraph, we desire not only to protest any further increase in the freight rates on our products but also to urge that existing rates be reduced.

Open-Top Car Service

In our judgment another matter may with propriety be brought to your attention at this time, viz: The question of an apparent discrimination against us and in favor of the coal mines in the use of open-top cars. Coal mines are permitted to have empty cars standing for days waiting to be loaded. They are also permitted to have them remain on the track many days without demurrage in either of these cases. In fact, I have known in this vicinity of one mine having forty loaded cars for at least two weeks without any demurrage charges. This practice is certainly unfavorable to the gravel plants.

Unless our products can move freely, regularly and at reasonable rates all public and private work in the country is exposed to serious delays, resulting in great losses to communities and owners, to say nothing about the effect on labor and contractors. Many of these contractors have taken work based on existing or lower freight rates. They can not operate without the prompt movement of materials, and they may have to face bankruptcy if they can have no relief.

Nature, Origin and Properties of Sand

Fourth Article—Voids—Methods of Determining Voids

ONE OF THE MOST IMPORTANT properties of sand and gravel, when used for concrete aggregates, is the voids contained. Every sand and gravel plant operator should be able to determine the voids in his material scientifically. The day may soon come when he will advertise and sell his product from a scientific description of the material based on such properties as outlined herewith. This article, like the three previous ones, is based on "The Sand and Gravel Resources of Missouri, by C. L. Dake, of the Missouri Bureau of Geology and Mines.

VOIDS—Because the grains of a sand do not fit together perfectly, there is within the sand a certain amount of empty space, known as pore space, or voids. The size of the individual voids is large in a coarse sand, small in a fine sand. In a sand of perfectly uniform-sized grains, the porosity is independent of the size of grain. A sand all of whose grains just pass a 20-mesh screen has the same porosity as one all of whose grains just pass a 60-mesh screen, provided the grains in both instances are of the same shape and are arranged similarly. With perfectly uniform-sized spherical grains, porosity varies between a minimum of 25.95 per cent and a maximum of 47.64 per cent. In practice, however, it has been found almost impossible so to arrange such a sand that it will show less than 44 per cent voids.

The more uniform the size of grain, the more nearly will it approach the computed theoretical value for any particular type of arrangement; the less uniform the size, the less will be the actual observed pore space. The reason for this is that in a sand which is not uniform, the small grains often lie wholly within the voids between the larger grains, in this way reducing the theoretical pore space. The smallest percentage of voids will occur with a mixture so graded that the voids of each size will be occupied by the largest grains that will lie wholly within them. As most coarse sands in nature are less uniform than finer sands, they frequently have lower voids. This is not, as is often stated, because the sand is coarse, but because it is not uniform in size.

The high porosity of uniform sands, as compared with that of sands not uniform, is responsible for the demand for sands with a low uniformity coefficient for filter purposes and for thoroughly graded and properly proportioned aggregates in concrete, because lack of uniformity or a high uniformity coefficient is associated with low pore space, and a consequent decrease in the amount of cement necessary in the mixing of the concrete. It is also to be noted that "Materials with round grains, such as gravel, contain fewer voids than material with angular grains, such as broken stone, even though the particles in both may have passed through and been caught by the same screens."

Determination of Voids

There are several methods in use to determine the voids in unconsolidated sands. The following is one: Into a large graduated tube a measured volume of water was poured. In another large graduated tube was measured a quantity of sand, thoroughly dried at 110 degrees C. In measuring this sand it should be allowed to fall slowly into the tube, and should be leveled off carefully without shaking down the sand. This gives the volume dry and unpacked. This measured volume of sand should then be poured into the measured water in the first graduate, slowly enough to wet all the individual grains and to fill the pores thoroughly with water, being sure that there is sufficient water to completely cover the sand. The bottom of the tube must be tapped until the sand is so compacted that several vigorous taps make no appreciable difference in the level of the top of the sand. Read the total volume of the mixture, that is, the surface of the water in the tube. Read also the surface of the sand; in other words, the volume of the sand including pore space. It is evident that the porosity of the loose dry sand measured in the first tube will be greater than that of the packed wet sand measured in the second tube. To get the porosity of the packed wet sand, the following formula may be used:

$$\text{Voids} = \frac{Vw - (Vt - Vs)}{Vs}, \text{ in which}$$

Vw = volume of the water in the tube, before adding sand,
Vt = total volume of sand and water in the tube,
Vs = volume of sand wet and compacted (including pore space), whence
(Vt — Vs) = volume of water above compacted sand, and
Vw — (Vt — Vs) = water in the pores of the sand (the total water less the water above the sand), or
Vw — (Vt — Vs) = actual porosity in the wet packed sand, whence

$$\frac{Vw - (Vt - Vs)}{Vs} = \text{proportion of porosity in wet packed sand.}$$

To get the porosity in the dry loose sand, use the following formula, having first measured the volume of the sand, dry and unpacked:

$$\text{Voids} = \frac{Vw - (Vt - Vd)}{Vd.}, \text{ in which}$$

Vd = the volume of the dry sand, all the other symbols being the same as in the previous formula.

The chief objection to the use of this method lies in the fact that by pouring the sand into the water there is a slight tendency to stratification, the finer particles forming layers at the top. In this manner, any given layer of sand becomes more uniform in size of grain than it was before, with a consequent tendency toward increased pore space. The fine grains, which would normally fill the openings between the larger ones, are massed at the top. This stratification will sometimes give a slightly excessive figure for voids by this method.

Just how important this error might become is suggested by the following facts: (1) In a well-rounded sand absolutely uniform in grain, the maximum porosity is 47.64 per cent and the minimum 25.95 per cent. These extremes are practically never reached, the average being about 44 per cent. (2) By careful grading and proportioning, mixtures can be produced with porosity as low as 10 per cent or 15 per cent, though this figure is of course much lower than the average for graded aggregates.

It is thus seen that by stratifying the sand, its uniformity in any given portion of the mass tends to be increased, with consequent increase in the porosity. To reduce the error to a minimum, care should be taken to see that the sample is thoroughly mixed on a sampling cloth before pouring. The sand should then be allowed to fall as short a distance as possible through the water. With a reasonable degree of caution, the error should not be large.

A variation of this method is to pour the water into the sand instead of the sand into the water. This eliminates stratification, but introduces an error in the opposite direction which is undoubtedly even more serious. In pouring the water into the sand, it is very difficult to get the pores completely filled, as many of them still retain air bubbles. In tests with this method, the mixture of sand and water after standing five hours still showed large bubbles which could not be shaken out.

This incomplete filling of the pores with water results in a porosity lower than should properly be obtained, and will not give as uniform results as by pouring the sand into the water. Tests on a very coarse sand by both methods showed only a slight discrepancy, the latter method giving a pore space 2 per cent lower than the former. On fine sand, however, the difficulty is increased, because the water penetrates with more difficulty. On a moderately fine-grained sand, the former method gave rather consistent results, three trials of the

same sand varying by less than 2 per cent; by the latter method (pouring the water into the sand) three trials varied from one another by over 4 per cent, and ran from 3 per cent to 6 per cent lower than when the sand was poured into the water.

Another method, based on the same principles as the one above, is to bubble the water up through the sand from below. The apparatus for this consists of a box or dish to hold a known quantity of sand. To an opening in the bottom attach a rubber tube and connect this with a graduated glass tube containing water. The graduate must stand sufficiently above the sand box to force the water down through the rubber tube into the sand. The flow of water is controlled by a pinchcock on the hose. A fine screen over the opening in the sand box prevents the sand from passing out into the tube below. After the graduated glass tube has been filled with water, the cock is opened, and the water allowed to rise in the connecting tube just even with the bottom of the empty sand box in order that it will not be necessary to compute the water in the connecting tube. The sand box is now filled with sand. and "stricken off" with a straight edge. If it is the porosity in loose dry sand that is desired, the sand is sifted into the box from a given height. If it is the voids in wet packed sand that is desired, the box is filled and tamped by a uniform method. In either case the water in the graduate is read. The pinchcock is then opened, and the water allowed to run till it just begins to overflow the edge of the box. The cock is then closed and the water in the graduate again read. The difference in the two readings is the water let into the pores of the sand. In other words, it is the actual volume of the voids. Expressed in formula this becomes:

$$\text{Voids} = \frac{Vw}{Vb}, \text{ in which}$$

Vw = volume of water introduced
Vb = volume of the box.

Even by this method there are likely to be air bubbles left in the sand. In order to detect these, glass containers of various shapes and sizes were used, and it was found that a container not too deep and high and an inflow of water fast enough to stir the sand slightly seemed to eliminate the bubbles best. It was found impossible, however, to expel the air entirely. This method, because of the air bubbles, gives a figure somewhat too small, just as the fact that sand stratifies when poured into the water, is likely to give a value too large. It is the method most commonly used in laboratories.

Numerous tests of voids on large and small samples of the same sand showed, as might be expected, that results on large samples were more consistent. With small samples (less than 100 cc.) successive tests on the same sample showed variations of from 2 to 5 per cent, while on larger samples (300 cc. or more) repeated trials checked to from ½ to 2 per cent. Small samples seemed to show a higher porosity, due probably to less compacting by weight of the sand itself.

Still another and probably the most accurate method of determining voids in a sand is the specific-gravity-weight method. First determine the specific gravity in the manner already indicated. Suppose this to be 2.64. Measure out in cubic centimeters a given volume of sand, say 100 cc. Then, if there were no voids, the sand should weigh 264 grams. (The weight of 1 cc. of water is 1 gram, and sand weight 2.64 times as much.) Weigh the sand. Because of the voids, it will weigh less. Suppose it weighs 144 grams. The difference in weight caused by the voids is 120 grams, that is, 120 grams of sand will fill the voids. Then

$120 \div 2.64$ = volume of voids in cc.
$(120 \div 2.64) \div 100 = .454$ or 45.4 per cent voids.

Expressed as a formula this would be:

$$\text{Voids} = \left\{ \frac{\dfrac{(Vc \times G) - W}{G}}{Vc} \right., \text{ where}$$

Vc = volume in cc.
G = specific gravity
W = weight in grams.

If the measurement is made in cubic feet, the formula will be:

$$\text{Voids} = \left\{ \frac{\dfrac{Vf \times 62.5 \times G - Wlb.}{G \times 62.5}}{Vf} \right., \text{ in which}$$

Vf = volume in cubic feet.
G = specific gravity.
Wlb = weight in pounds.
62½ = weight in pounds of one cu. ft. of water.

For the sake of convenience, one cubic foot is usually taken. Then 62.5 lb., the weight of a cubic foot of water, times 2.64, the specific gravity of the sand is 165 lb., the weight of a cubic foot of the sand, if there were no pores. If the actual weight were 100 lbs., then 65 lbs., the deficit, is the weight of the sand which would fill the pores. Then the proportionate volume of the pores is $\frac{65}{2.64 \times 62.5} = .394$, and the percentage voids is 39.4. It will at once be noted that as the volumes are in proportion to the weights, the percentage voids can be determined by dividing the difference in weight directly by the theoretical solid weight. In the first instance 120 is divided by 264 and in the latter 65 by 165.

A knowledge of the voids in a sand or a gravel is of considerable value, because in aggregates for concrete, the lower the voids, the less cement is required for mixing. A well-graded and proportioned aggregate containing several sizes from coarse to fine is more economical than a very uniform aggregate with a high porosity, because a low uniformity coefficient signifies, in a general way, high voids, while a high coefficient is associated with lower voids.

(To be concluded)

Rock Products Tests by the U. S. Bureau of Standards

WASHINGTON, D. C.—Reports furnished by the Bureau of Standards to the Washington Bureau of ROCK PRODUCTS include a summary of work now being conducted in relation to the weathering of stone. The bureau is conducting mechanically controlled weathering tests on samples of various building stones and has already obtained complete disintegration of some specimens in less than 100 successive freezings and thawings, while others show practically no signs of disintegration after 300 such expostures.

In connection with the investigation of oil storage in concrete tanks, which has been in progress for some time and upon which final results are not yet available, examination of one tank containing lard oil for one year showed that the surface of the concrete had disintegrated.

Cracks in Stucco Surfaces

Experiments for the elimination of cracks in stucco surfaces have been undertaken by the Bureau of Standards and some very interesting results obtained. The cracking of stucco surfaces is largely due to the volume changes in the mortar which occur during the time of its setting. In order to determine methods by which this injurious cracking may be eliminated, the bureau is carrying out an investigation of the nature of shrinkage occurring in various mixes of lime and cement mortars.

It has been found that a high humidity may, to a considerable extent, offset contraction and will produce less shrinkage than would otherwise have taken place, even if the high humidity has lasted only for a short time; moreover, if expansion is produced by retention of water at the surface, this expansion will perhaps permanently offset a similar contraction. The results obtained at the present time cannot yet be considered as conclusive.

Unsoundness of Lime Plasters

Two definite conclusions have already been reached through experiments of the Bureau of Standards into the unsoundness of lime plasters. First, the plaster sand should contain not over one per cent of sodium chloride, two per cent of magnesium chloride and ten per cent of red clay; and, second, specimens made of twelve different plastering sands from as many different cities indicate that inferior quality of sand is frequently responsible for the so-called "popping" of lime plaster. Eight of these twelve sands made unsound plasters and there is evidence that this was not due to the lime. This effect is seen in the expansion of small particles of the plaster, so that they finally push themselves out of the wall, leaving pin holes of "pops."

Beginning New Era in Sand and Gravel Producing Industry

Indiana Association Making Strides That Will Place Industry on Recognized Footing

HOW OFTEN has it occurred to producers of sand and gravel that they are generally credited with knowing less about the material *they produce* than the engineer, architect or contractor who writes the specifications? And the unfortunate part of the thing is that the popular assumption is too often true; for how many sand and gravel operators know what a mechanical analysis of their material is, let alone being able to discuss intelligently with scientific men its other qualities as concrete aggregate?

A Change Coming

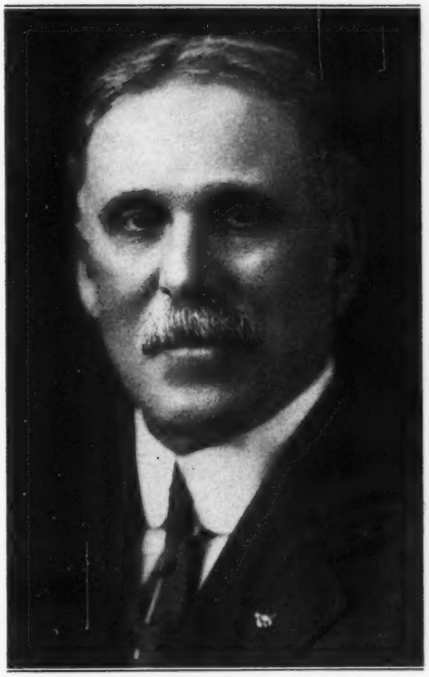
One group of sand and gravel producers has reached the conclusion that the time has come to instruct others how to use their material to avoid failures, instead of accepting rules and regulations from men who know nothing of production problems. That group is the Indiana Sand and Gravel Producers' Association, which is already engaged in a series of tests, at the laboratories of Purdue University, which determine the qualities of the aggregates produced by its various members, how to use them for the best results, how to change the method of preparation to improve the aggregates—in short, to supply ammunition to defend the stand that the association may subsequently take in instructing users of the material how best to use it.

These tests are being made under the supervision of the association's engineer, R. C. Yeoman, who has been a member of the faculty at Purdue University. He explained at a meeting of the association in Indianapolis, September 4, that these tests were only the beginning of a much more elaborate series, which would eventually give the Association more knowledge of Indiana sand and gravel than could be found elsewhere.

Quiz State Highway Engineer

H. K. Bishop, newly-appointed State Highway Engineer of Indiana, was the principal guest at the luncheon of the Association at the Claypool Hotel. Mr. Bishop made a short address in which he earnestly asked the co-operation of the members in the interests of the best possible road construction. He stated frankly that his previous experience in highway construction had made him look more favorably upon crushed stone as a coarse aggregate for concrete than on gravel.

The theory that he advanced in defense of this stand was that gravel lacked uniformity of composition, i. e., that some of the stone was soft and some hard. He contended that the soft stones, which found their way into the wearing surface of a concrete pavement, were crushed and broken out, leaving holes. Mr. Bishop said that ten years ago the chief aim of the road builder was drainage; today it was uniformity of aggregate. When his attention was called to it, Mr. Bishop admitted that the various limestone deposits of the State might also be subject to the same lack of uniformity in product.



H. C. Huffstetter, President, Indiana Sand and Gravel Producers Association

Although the sand and gravel producers present could hardly agree with Mr. Bishop's rather unique explanation, they were all impressed with his self-evident fair-mindedness and openness to receive suggestions from both contractors and material men. He did say that his construction program was so big that there was no question about his using all the sand and gravel, as well as all the crushed stone that the plants of the State could produce.

Mr. Bishop was asked a number of questions in regard to his knowledge of Indiana limestone and gravels; he was told of the tests being made by the Association and expressed great interest. He agreed to receive suggestions from the producers in revising his specifications for sand and gravel and to take up directly with them difficulties in meeting specifications as they came up.

To Be Able to Prove Value of Gravel

After Mr. Bishop had left, the members of the association engaged in a real heart-to-heart discussion of Mr. Bishop's criticisms of gravel aggregate, the outcome of which was their determination to be in a position to prove the value of their product. In this discussion several prominent producers took a leading part, and if their views of a sand and gravel producer's duty to his customers are carried out, a new era of the industry has begun.

This will be an era in which the producer leads in establishing quality.

Hitherto the sand and gravel producers of the State have been at the mercy of the parties writing specifications, who may know nothing whatever of the concrete value of the particular sand and gravel with which they are dealing; and specifications were often written that worked severe hardships upon the producers at a time when the margin of profit was very meager indeed. It would now seem that this Association is putting itself in a position to experiment and test, to be able to sustain any just contention that its members may make.

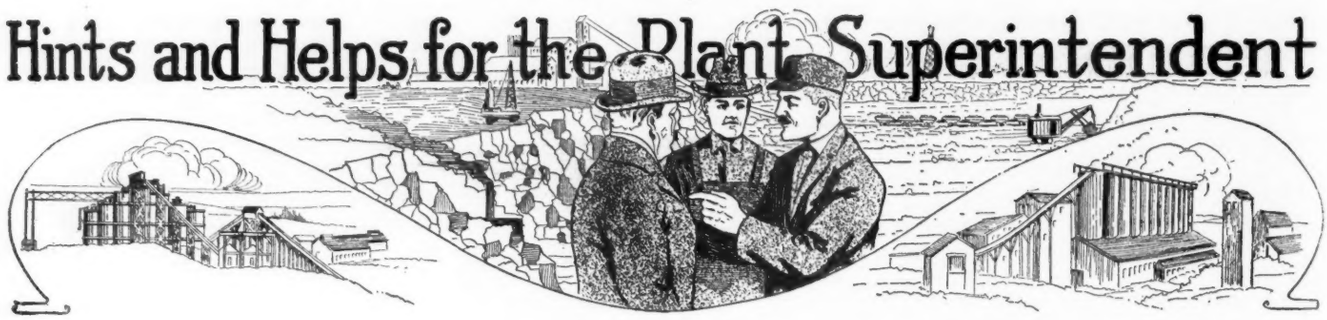
Real Building Prosperity at Detroit, Mich.

BUSINESS prospects in Detroit never were greater than at present, and the sand and gravel producers are being taxed to the limit to supply the demand. Sand, gravel and stone are brought to Detroit by boat and by rail.

The United Fuel and Supply Co. and the Superior Sand and Gravel Co. report that in spite of increased production facilities they are unable to meet the demand. A seven-million-dollar hotel, a large new plant for the Cadillac Automobile Co., and the Ford tractor and blast furnace plants are a few of the biggest operations.

Due to the increase in big business the town is full of transient people who are waiting for houses to be built so that they may make Detroit their home. Business men are quite optimistic of the future.

Hints and Helps for the Plant Superintendent



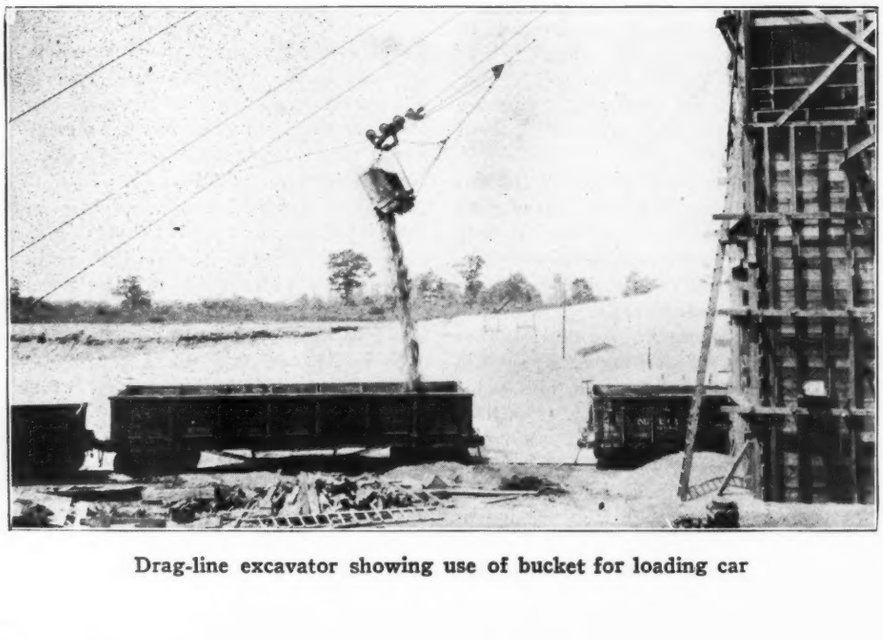
Operating Drag-Line in Dark

BY PAINTING WHITE MARKS on the cables, the engineer of the drag-line cableway excavator at the plant of the Willard Sand & Gravel Co., Farmingdale, Long Island, N. Y., is able to operate the machine when it is too dark to see the bucket.

F. C. Willard, manager of the company, writes that to meet present demands for sand and gravel in their vicinity they are working 16 hours a day. This means that the first hour in the morning and the last hour at night the operator is working in the dark, but with a common No. 2 lantern with reflector and the guidance of the white marks on the wire rope, he succeeds in operating the cableway at almost normal speed.

While the Willard Sand & Gravel Co. operates the drag-line cableway excavator chiefly in connection with a screening plant, the machine is also used for loading gondola cars with pit-run material. Moving the stop button on the main cable from its position over the receiving hopper at the screening plant to a position over the railroad siding changes the dumping point of the bucket automatically, and it then discharges its contents into the cars, as shown.

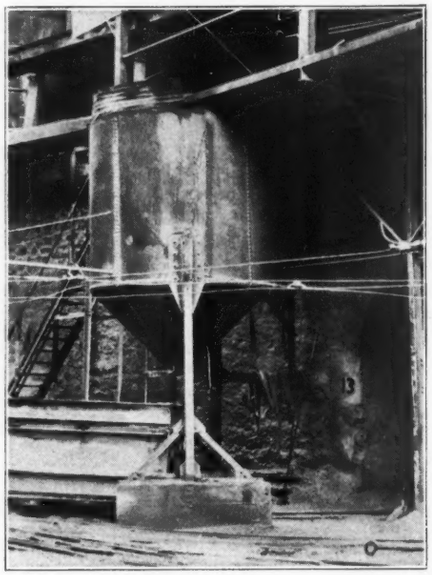
The above data was furnished by Sauerman Bros., Chicago, who installed the cableway excavator.



Drag-line excavator showing use of bucket for loading car

Steel Ash Bin

GETTING RID of ash and core at lime kilns requires a certain amount of hand labor. That labor can often be lessened by the use of bins like the one shown. The top is on a level with the firing floor of the kilns, while quarry or kiln cars can be run under the bin or tank to carry away the material.

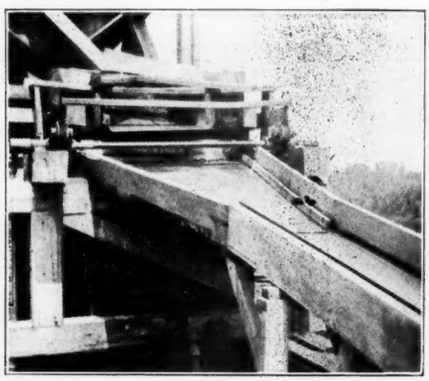


Lime kiln ash receiver

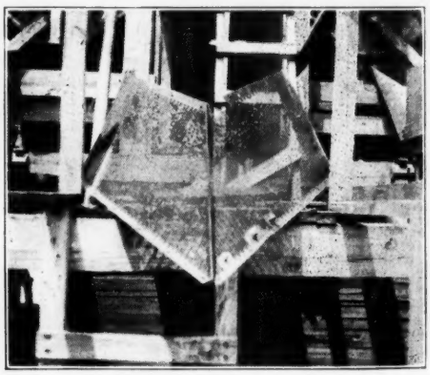
Sand Separation Device

THE COVINGTON SAND AND GRAVEL CO. of Covington, Ind., had to deal with a sand-separation problem and met it in a satisfactory way by the installation of the screen as shown in the accompanying views.

It was the intention when the plant was erected that the two large settling boxes should care for the coarse and fine sand.



Screen and chute in place



How the screen is made

All the material passing the last gravel screen was sent down a chute to a first settling box which was to remove the coarse sand—the fine (builders') sand passing the overflow to the second box where the dirt was to be removed.

Upon starting of the operation, it was found that the first settling box would not remove the sand, so the screen was adjusted in the mouth of the chute to give the required separation. The effect of the screen is chiefly to slow up the

current of water. It is made of ⅛-in. perforated plates. By changing its position in the chute the size of the product in the first tank may be made to suit any requirement.

The second view is of the screen before it is put into the chute. It is made of two flat screen sheets bolted together along the front edge or nose so as to give the sides a slope of about 60 degrees. H. G. Young, the manager of this plant, has found this a very useful method of increasing the capacity of the coarse sand box.

Boulder Storage at Gravel Plant

THE SUMMIT SAND & GRAVEL CO. at Terre Haute, Ind., is provided with a storage bin for the uncrushed rock that is rejected by the gravel screen. This bin has a capacity of about three carloads. Its use enables the company to store rock when it has exclusive orders for fine sand or torpedo sand.

When the demand for sand is greater than the demand for coarse gravel, and it is necessary to run the plant to make sand only, a chute is opened at the gravel screen which diverts the rejections from the path to the crusher to this storage bin.

Later, when the demand for coarse gravel comes, the company has a ready supply of stone to crush. The stone is fed out of the bottom of the bin, as shown in the illustration, on to a belt, which carries it to the main elevator and up the screening tower. On this trip through the gravel screen it is chuted to the crusher.

Plant for boulder storage crushing and screening

The crusher, as can be seen in the illustration, is provided with a screen basket top to prevent the rock falling out while being fed to the crusher. The output of the crusher returns to the screen by the same belt used to tap the stone bins.

Storing Sand in Pit Bins

R. SNODDY, manager of the Coon River Sand Co., Des Moines, Ia., has a good many original ideas about sand and gravel producing. The two views below illustrate one of them.

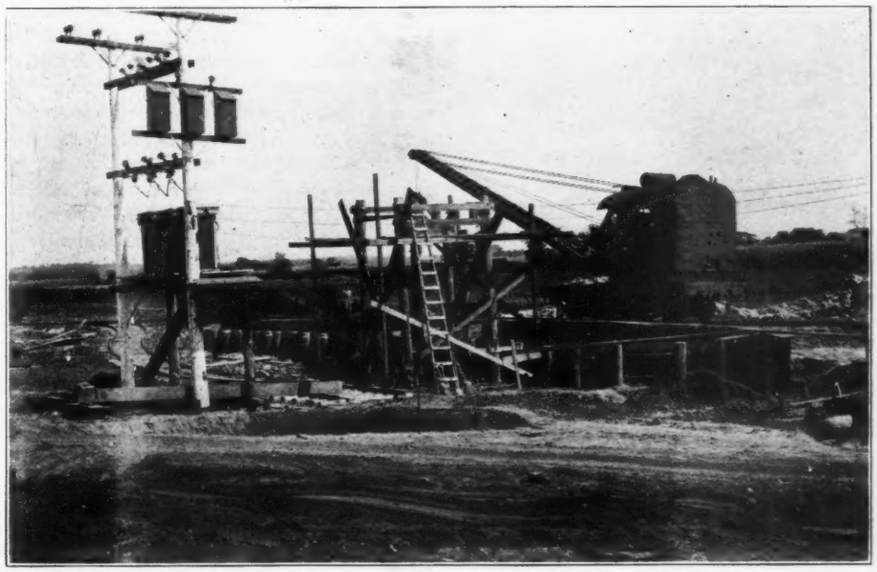
These are views of a new plant under construction in the outskirts of Des Moines. To all appearances it is a dry land proposition. But it is the bed of an old lake and the water is there, 12 or 15 ft. below the surface.

Therefore, Mr. Snoddy is going to make it a pumping proposition. The material will be pumped to a screening plant erected on the structure shown in the first view. This structure is only high enough for the screen rejections—the gravel—to be discharged by gravity to the hopper of a conveyor belt below.

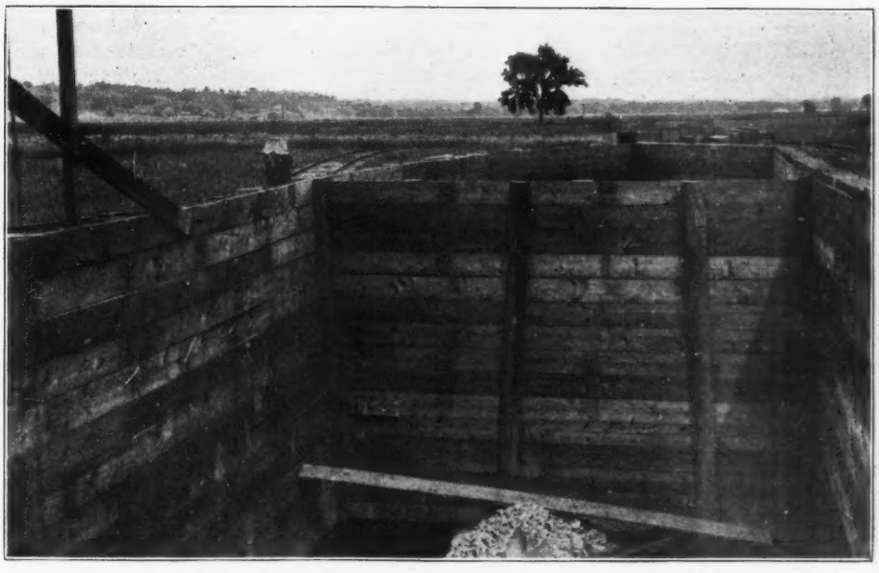
The fine and course sand which pass the screens will be diverted by chutes into two storage bins, which are below ground level. The gravel will go by a belt conveyor to a screening plant over elevated car-loading bins.

The sand is loaded out of the pit-bins by a locomotive crane and clam-shell bucket, which requires very little more effort than loading it out of ground storage piles by the same method, and it saves all other elevating or handling.

The bins are constructed of piles driven by the locomotive crane rigged as a pile driver, and boarded up with 2-in. planks. The two ends of the bin come together in a point of about a 60-degree angle. The piles along the sides are anchored to others, driven some distance away, by wire rope, which prevents the sides of the bin from caving in when the bin is empty.



Coon River Sand Co.'s new plant under construction near Des Moines, Iowa



Sand storage bins below instead of above ground level

Urgent Need of Labor-Saving Appliances in British Rock Products Industries

With Present Labor Prices British Manufacturers of Cement and Lime Cannot Meet Foreign Competition

By Capt. Henry Pooley
Of Brown & Pooley, Ltd.,
Consulting Engineers on Cement, Lime and Allied Industries, London, England

IN NO TRADE is the need for labor-saving appliances so apparent in Great Britain today as in the cement industry and in the building materials trade. Just now the demand for houses is far greater than the supply, and material for building is scarce. In most quarters it is recognized that the concrete house is the only solution, and yet the price of cement is prohibitive and the supply poor. To cap everything, the cost of labor is tremendous for this country, and the result is that a house which would have cost £1,000 ($5,000)* before the war, now costs nearly £3,000 ($15,000).

What is the reason for this? Clearly it all comes back to the increase in the wages demanded by labor, and as the high wages now paid will not return to anything like their pre-war level, the people in this country are face to face with either a decreasing trade brought about by these high labor prices and antiquated methods, or they must adopt proper up-to-date labor-saving devices and improve their methods of working.

Old Vertical Kilns Still Used for Cement

Take the cement trade. The price of cement in Great Britain early in July of this year was round about 65/—($16.25) per ton. The rise of 6/—($1.50) per ton in the price of coal that the Government has recently imposed to cover the labor awards in the Sankey scheme, will further increase the price of cement about 3/—(75c.) a ton. Every day the price goes up for some excuse or other. The real reason is not difficult to find. Manufacturers are content to use the methods and machinery put in by their grandfathers. For example, instead of replacing the old and wasteful vertical kiln for burning the cement with the modern rotary kiln, types of the former are still to be found more often in use than types of the latter.

Again, it is a sad thing to watch the methods in the quarry. It would seem impossible that cement manufacturers should still excavate by pick, shovel, and crowbar, yet such is the case in very many instances. Some of the larger concerns have modernized in this respect and employ the steam shovel, but very few if any have yet used the "big hole" method of blasting. It is impossible in a small space to go through every operation in British cement making, but if this were done, there would be few particulars indeed where the methods of working are up-to-date.

The curious thing is that this state of affairs is not seriously disputed by the largest and nearest up-to-date manufacturers. They admit it. They must do so, for the whole matter is patent to any one who knows the industry. Yet so far they have made little or no real effort to modernize on a large scale. True, as already remarked, here and there modern machinery and labor-saving devices have been installed, but in this problem one can not tinker in a small way. The reformation must be carried out to a large scale. The old plants must be turned out root and branch. The reorganizer must ride rough-shod over old methods. But chief of all, modern labor-saving machinery must come.

Look to United States for Guidance

There is no reason why the reorganization of the industry should not lead to a much closer commercial relationship between the United States and Great Britain. We in this country have much to learn in this particular respect, and the sooner we commence the sooner the industry will right itself. We can hardly go to a better school than the United States for new methods, because the States themselves have successfully faced the question of high labor costs in the past. In this respect, too, the States can help us with the supply of really up-to-date machinery.

The price of cement a month ago was 65/—($16.25) a ton, and it is more today. It is only this large figure which keeps some of the cement works in this country above water, and even then many only just pay their way, while others have been obliged to close down. But on the other hand, there are other factories which have modernized more or less, and in spite of bad features, they pay well and could afford to sell their product at a much lower figure, and still pay fairly well.

A fortune awaits the man who will put up a really modern factory in this country, complete with all the latest machinery and labor-saving appliances. He must, of course, employ the best engineers in the choice of his site and in the planning of the layout. There is an unlimited supply of the best possible raw material. Water and railroad facilities abound, and if the product could be sold with cement at its present price, a return of almost cent per cent could be guaranteed. Not only would he reap a large benefit himself, but he would help the country in that he would tend to lower the price of cement and force other makers to adopt modern methods. The remarks which follow illustrate the truth of this statement:

Cost of Cement Manufactured in England

The writer recently had occasion to go very carefully into the manufacturing costs of cement in this country, and allowing for the most exorbitant labor charges and the high cost of fuel, he found that cement could be made for 25/—($6.25) to 27/—($6.75) a ton, works cost. Assuming other charges to be, say, 2/6 (63c.), this leaves a margin of about 35/—($8.75) a ton (at the price of cement already quoted) to play with for dividends, directors' fees, reserve fund, etc. This figure is estimated on a 150,000 tons per annum basis. Here again it is no use tinkering with the matter. The thing must be done properly or not at all, and any one who expects to obtain the same result by putting up a smaller plant, which it is well known will not run so economically, will not meet with such success. So much for cement making.

Building Materials Generally

Today, Great Britain is faced with such a need for houses that in proportion it is only rivaled by the needs of the devastated areas in France and Belgium. The armistice with Germany was signed on November 11, 1918. At the time of writing, we have reached the month of August, making nine months after that date, and very little if anything has been done. Certainly nothing has been done on the scale which is required. What is the reason? Simply that builders are hampered by the high cost of everything, and by the wages

*For converting to American money in round figures a pound is taken at $5 and a shilling at 25c.

they are obliged to pay. People fight shy of the present cost of building. Too, there is a delay in the production of the number of bricks that would be required to build the houses of brick. The transport charges and delays in transport are enormous, and add considerably to the price and difficulty of obtaining everything the builder requires.

Big Opportunity for Concrete Blocks

Here again the remedy is "labor-saving devices." If the cost of your product is too high, get rid of the high-priced labor and substitute a labor-saving appliance. The transport difficulty may be overcome by making concrete blocks on the site. For example, at a certain place, so many hundred houses are required. Clay bricks to make these houses need to be transported by rail so many hundred miles, adding tremendously to their cost and time of delivery. Why not, instead of shipping each brick, ship your portable plant for making cement blocks and manufacture them on the site in a very short space of time? This job done, and your blocks ready, ship off your same machinery to the next site, and so on. There is only a little co-operation needed and a little common sense, and the transport difficulty is solved.

There are machines on the market whereby 12,000 blocks per day can be made by a plant requiring only eight men to operate. Here is a way to reduce costs at once, for as far as the writer is aware, there is no plant of the description working today in this country. Tile-making machinery is on the market, and cement tile can be turned out by the thousand, with considerably more facility than by the methods employed today in Great Britain for burning clay or quarrying slate. Door posts, lintels, window sills, staircases, cupboards, furniture and all things necessary for the house, even down to a vault, can be made in concrete, cheaply and with little labor, if proper moulds and methods are used. All these things are foreign to this country, and all would help to reduce the cost of building to a figure not far removed from that of pre-war days.

These things the builder on this side of the water must learn if the present demands are to be properly met. Not only will he make cheaper houses thereby but he will be able to make them quickly, which just now is almost as important.

Proposes Anglo-American Labor-Saving Exhibition

What an opportunity there is for some enterprising individual who will hold an Anglo-American Labor-Saving Devices Exhibition for builders, say in London! Here all the latest in the way of American or British labor-saving machinery could be exhibited, explained and sold, and much benefit to all would result. This is a proposition which should appeal to the American manufacturer of this class of machinery.

Must Brush Up on Uses of Lime

Let us take another department of the building trade which is sadly behind the times. The proper use of hydrated lime for building purposes, in the sense that it is familiar in the States, is absolutely unknown here. Think of the saving to the builder who will use it intelligently. Instead of the present method of mixing and slaking the lime, which takes time and labor, he should be able to buy his bags of hydrated lime and use them with the knowledge that his mixture will be uniform and right every time. Here is another proposition which should interest Americans. The introduction of hydrated lime, the explanation of its various uses, both in building and agriculture, its manufacture and sale in this country, is a scheme bristling with possibilities.

American Appliances Wanted

Really what is wanted is that some influential syndicate should systematically introduce from America into this country all the latest labor-saving appliances which would be of use to the builder. They could commence with an exhibition, as already indicated, and there is no doubt that, if properly worked, the scheme should not only be a financial success but a material benefit. Unless something of the sort is done this country can not look forward to prosperous times in the building trade, nor can people hope for houses at a reasonable figure. High prices, exorbitant labor charges, and so forth, with the resulting labor trouble, is all that can be expected.

Must Exchange Experiences

In this connection, as in many other industries, one of the first axioms that the people in this country must learn is the proper diffusion of knowledge between manufacturers. In the States this is carried out. Manufacturers do not hide their light under a bushel and forbid others in the same line as themselves to examine their method of working and to make suggestions. These suggestions are freely circulated and commented upon with the result that open and healthy competition is carried out and the industry is stimulated thereby.

In this country there is a competition, too, but of an unhealthy kind. An improvement is made in working and the secret is carefully kept, leading to endless waste of energy on the part of others to do the same thing, whereas that energy might have been employed improving upon it. It does not hurt the manufacturer to share his secret. When others know it, he is kept up to concert pitch and is always improving, and although the secret method may give him a pecuniary advantage for a short time, the other will be the better in the long run. Our present system in this country has led to the stagnant conditions today.

Manufacturers have not been stimulated and have not improved. They have been content to follow in the footsteps of their forbears on the principle of "that's been good enough for the old man, and I reckon it's good enough for me." What has been good enough for "the old man" is not good enough now, for things progress and conditions alter. This is the real root of the trouble and the chief lesson we must learn from the States. Let us hope that the people of Great Britain will wake up to this fact right now and that in consequence, not only a diffusion of knowledge between themselves will result, but that ideas and methods will be freely exchanged between the two countries, and that they will be acted upon. Then we can rest assured of a healthy and prosperous industry.

The German Portland Cement Industry Has Difficulties

WASHINGTON, D. C.—Advices just received from Germany state that the annual report of the Rhine-Westphalian Cement Union says that the unfavorable conditions from which the cement industry suffered in 1918 have grown worse during the current year.

Coal prices have risen, working hours have been shortened and wages have been increased, so that the cost of production has increased still further, while, owing to irregular deliveries of coal, due to strikes, production has had to be curtailed. The factories are thus suffering losses which can not be compensated this year by profits of the export trade, as shipments to the Netherlands have dwindled down to a minimum and the export prices have been reduced to about one-half of the prices obtained last year.

The demand for cement is declared to be unusually large, but owing to the scarcity of coal the factories are unable to deliver the quantities needed. The syndicate declares that if the cement industry is to be burdened with new taxes the government should give it protection by continuing in force the order of the federal council forbidding the establishment of new cement factories until the demand for cement shall exceed the capacity of the factories now existing, by levying a suitable duty on imported cement, etc.

Limestone for Houses

THE INDIANA LIMESTONE ASSOCIATION has perfected arrangements, according to the Leader of Cleveland, O., to furnish limestone veneer for moderate priced houses in small sizes nearly the dimensions of a brick.

Design of Large Rock-Crushing Plants

Part II—Types of Elevators and Their Application—Screens—Rejections Crushers

By Brownell McGrew

CHOICE OF EQUIPMENT and descriptions of the various types of crushers, and the uses they are best adapted to, were the subjects previously discussed in this series of articles. (See ROCK PRODUCTS, August 30, pp. 26 and 27.)

Elevators

Three general types of elevators have been developed to handle the heavy tonnage produced by the modern "mammoth" breakers. These are the pan conveyor, belt conveyor, and the skip system.

The Pan Conveyor

The pan conveyor, or bucket elevator, is a development of the old and well known belt-and-bucket elevator—the pans or buckets being attached to heavy strap link chains, and the whole carried upon an inclined track on rollers at the link joints. The usual angle of the track with the horizontal is about 45 degrees, though flatter or steeper conveyors may be installed to meet requirements.

The great weight of the pan conveyor and the heavy load carried by it necessitates a rigid supporting structure. For centers of 100 ft. and over it is advisable to use steel for this purpose, whether or not the balance of the plant is constructed of this material.

The largest pan conveyor of which the writer has knowledge is the 72-in.x145-ft. elevator in the Tompkins Cove crushing plant. This machine was designed to handle 1000 tons per hour up a 45-degree incline. The writer's experience with this type of elevator has led him to believe, however, that the distance between centers should be kept well within the above figure, to avoid excessive upkeep cost.

A feature which recommends the pan elevator, in common with the belt conveyor, is that it provides an even feed to the screens without the use of automatic feeders or of a receiving hopper in the screen house; thus cutting down some of the headroom that is required when the skips are used. This advantage holds good also at the receiving end, where either the pan or belt conveyor will effect a considerable saving in foundation cost, in comparison with the skips. The self-feeding feature, of course, holds good only where the screening and re-crushing units are evenly balanced with the initial breaking plant, as regards capacity.

The Belt Conveyor

Light weight, moderate initial cost, reliable performance, and the little attention required, are features that combine to make the belt conveyor a very efficient and popular method of elevation. This type of elevator is particularly effective on hillside locations where the height of elevation is not great.

They operate satisfactorily on inclinations up to 20 degrees; and at this slope, centers of as high as 300 ft. may be used, though it is advisable to stay below this figure when possible, on account of the high stress in the belt when carrying a heavy load.

In designing a belt conveyor of long centers, do not be governed in width selection entirely by the capacity figures given in the manufacturer's catalogue. These figures are conservative and reliable, of course. The conveyor will do what the manufacturer says it will. Nevertheless, on long center conveyors an ultimate economy will be effected by increasing the belt width. The reason for this is obvious. For a given capacity, the longer the centers, the heavier the load upon the belt will be—and consequently, the higher the fiber stress in the fabric.

One way of reducing the unit stress would be to increase the thickness of the belt. But the thicker the belt is, the more pronounced is the stretching of the top plies over the pulleys. This overstretching tends to tear the plies apart; and on rubber belts induces cracking of the rubber "blanket." This objectionable feature is eliminated by the use of a wider and thinner belt. Another point in favor of the wide belt is that surface wear is reduced somewhat by distributing the load over a greater area.

The capacity range of the belt conveyor is extensive enough to meet any demand in that respect. They may be installed in batteries, with considerably less than proportional cost of supporting structure, above that necessary for the single belt.

Feeding Belt Conveyors

Many operators object to the belt conveyor on the ground that big stone causes heavy wear and tear on the belt. In the majority of cases the source of this trouble can be traced directly to improper delivery of the material to the conveyor. Of the problems entering into conveyor design, the writer believes this to be one of the most important, as the life of the belt depends upon correct methods of feeding the stone to it.

The material should *flow* onto the conveyor at approximately the same speed and in the same direction as the belt is traveling; and the angle between the stream of material and the belt should be as small as it is possible to make it. An excellent method, where run-of-crusher is being delivered to the conveyor, is to install a short section of grizzly in the chute above the point of discharge, so that the fines may drop through and blanket the belt against the impact of the big stone.

Mechanical feeders may be installed to check the rush of material and deliver it to the conveyor in a uniform stream. There are instances where their use is advisable, as for instance, when the capacity of the initial breaking plant is greater than that of the finishing machines. In this case a hopper between the crusher and the conveyor may be installed to provide the necessary flexibility; and the mechanical feeder used to provide uniformity of delivery to the belt, and hence, to the rest of the plant.

In most instances, however, their use can be dispensed with by the substitution of properly designed chutes—the box chute being preferable for this purpose. When the vertical distance through which the stone has to fall is great, baffles should be placed in the chute to check the velocity of the material.

Skips

The skip system of elevation was developed to meet the demand for an elevator capable of operating at greater heights than is feasible with either the belt or pan conveyor. The idea, borrowed from the familiar system of blast furnace feed, was introduced into the stone-crushing industry at a comparatively recent date.

One very favorable feature of the skip system is the flexibility it provides between the initial breaking plant and the screening and re-crushing units, by virtue of the receiving hopper under the crusher, and the discharge bins at the top of the plant, from which the finishing units are fed. Many operators install the largest breakers built, in plants of medium capacity, in order to take advantage of the saving in quarrying cost that the big receiving opening affords. Trains coming into the crusher house can be fed through as fast as the main crusher will take them; the skips in the meantime operating at their maximum speed, discharging the material into the

receiving bins, whence it is fed to the rest of the plant in a uniform stream. This allows the plant to utilize the time between trains in getting rid of the accumulated product. Satisfactory separation can thus be attained by the use of smaller screening and re-crushing units than are necessary when the load must be handled as delivered by the primary crusher. The same idea can, of course, be applied to the other two types of elevators, but the additional height of elevation required will sometimes prohibit it; whereas 20, 30 or even 50 ft. additional range makes but little difference so far as the skips themselves are concerned.

Other advantages are the few moving parts, small upkeep cost, and the fact that during periods when the initial crushing plant is running empty the skips are not in motion, thus cutting off power consumption.

The first cost of plants using the skip system is generally higher than that of plants equipped with belt or pan conveyor—due not so much to the cost of the machinery itself, as to the increased cost of foundations and building. This fact has curtailed their use in the past largely to high capacity permanent plants, where the market for the quarry's output is fairly uniform the year round.

Screens

The standard screen for separating the larger sizes of stone is the cylindrical revolving screen. These screens are built in a variety of diameters and lengths, and are used to separate all grades of material, from the primary crusher-run down to ⅜ and ¼-in. screenings.

They are made in two general styles: the open end, and the closed end. The open-end type is the better screen for handling the coarser grades of stone, as for instance, where a scalping screen is placed between the main and secondary breakers to relieve the latter machine of the task of handling the undersize material produced by the former. The superiority of the open-end type for this class of work rests in the fact that there are no ribs or other obstructions to interfere with the free discharge of the stone at the lower end of the screen.

When the bulk of the material to be handled does not exceed 6-in. ring size, the closed-end type is a very satisfactory and reliable machine and, other things being equal, is somewhat more economical than the other.

Where the screening duty is very severe, it is advisable to use manganese steel sections in place of the sheet steel plates generally employed. Care should be exercised, when purchasing screen sections from other than experienced manufacturers, to see that the punching is properly done, as incorrect spacing or disposition of the holes with respect to each other will greatly decrease the efficiency of the section.

Stationary bars screens, or grizzlies, are sometimes used as scalpers to take out dirt or fines, or to bypass the fine quarry spalls and dust around the primary crusher. They are not an efficient screen, being apt to clog in wet weather, and passing a high percentage of slabs.

As the writer does not intend to deal with separation below ¼-in. ring in this article he feels that it is unnecessary to take up other types of screening machinery, such as the hexagonal revolving screen, and the shaking screen. For separation above the size mentioned, these types have nothing to recommend them over the cylindrical screen. As far as clogging on wet, sticky material is concerned, the cylindrical type is just as good as the others; and it is certainly a more efficient machine as regards upkeep and reliability.

Rejections Crushers

There are several types of crushers used for reducing the screen rejections, or oversize. Of these, the gyratory is the best known and most commonly used, where large quantities are to be reduced to the large or medium commercial sizes. The characteristics mentioned under the heading of "Main Breakers" holds good for the smaller machines. Some of the manufacturers of crushing machinery are putting specially constructed gyratories on the market to take care of oversize reduction, so proportioned that they combine large capacity with uniformity of product. These machines will recommend themselves to the operator who wishes the bulk of his product reduced to medium and small commercial sizes.

It is probable that, as some manufacturers claim, the smooth head on the gyratory rejections crusher will give a more uniform product than the corrugated head. Certainly it will give a smaller product for a given opening. But the writer's experience with the smooth head has led him to believe that it is much more apt to flake the stone than the other, and hence, that its use should be avoided when crushing stone of a "slabby" character. The same may be said of the smooth faced rolls.

A type of rejections crusher that does not seem to have received the attention which its merits warrant, is the double, smooth or burr-faced rolls. For reliability and power economy they are surpassed by no other type. They are a fast, clean breaking machine, easily adjusted for different sizes of product; and will give a smaller proportion of extreme fines than any of the other types. In the latter respect the burr-faced rolls are superior to the smooth; and they will also give a more cubical product. They will not, of course, turn out as small a product as the smooth rolls.

The disc crusher is another type designed to produce the smaller commercial sizes. They are economical as to power consumption and upkeep, and take up very little headroom. For a given capacity they are a lighter machine than any of the other types. They embody a principle that is highly commendable in a rejections crusher; namely, that of having a discharge opening whose area ratio to the receiving opening is large. The writer has never had the opportunity of analyzing the product of the disc crusher; but he believes that the above-mentioned feature should entail less dust in the output than in that of the gyratory, as it eliminates the "fletcherizing" of the latter machine. On extremely hard rock, the disc crusher will hardly compare favorably with its more rugged rivals.

There is an ever-increasing demand for small-medium and fine grades of stone for road surfacing, reinforced-concrete work, and so forth. For producing large quantities of this material either the rolls or the disc crusher are well adapted.

As a re-crusher, the jaw has little to recommend it, aside from its bull-dog reliability and rugged construction. Its capacity, as compared with the other types, is low; its power consumption per ton of product is high; it has the gyratory's penchant for "fletcherizing" and lacks the latter's virtue as a slab breaker. The jaw crusher has its good points—but rejections crushing is not one of them.

[The next article will discuss the general problems of plant design and the construction and use of a flow sheet.—Editor.]

Method of Testing Shale for Oil Content

FOR THE BENEFIT of those who desire to test their own shale for oil content with the idea of arriving at the number of gallons of oil which can be obtained from a ton of shale, the following very simple method may be followed: After treating a quantity of shale in a laboratory retort the number of fluid ounces recovered should be multiplied by 250 and the product of this multiplication divided by the number of ounces of shale. The result obtained will be equal to the number of gallons of oil which the shale will run per ton. For instance, after treating 10 ounces of shale in a retort and the amount of oil recovered being 3 ounces the product of the multiplication of 3 by 250 is 750. Dividing 750 by 10, the number of ounces of shale, gives 75. Therefore, the shale treated would run 75 gal. of oil per ton.

The Western oil shale industry is slowly but surely developing into an important quarry industry.

Crushed-Stone Plant Without Conveyors

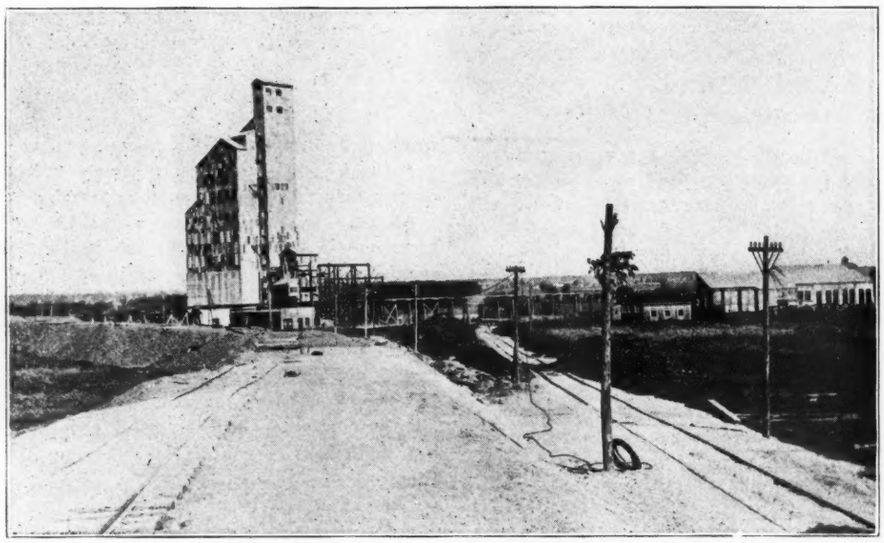
In the Laurin & Leitch Engineering & Construction Co.'s Plant Near Montreal, Que., the Material Is Elevated Once and for All—No Rehandling—A 208-Ft. Structure

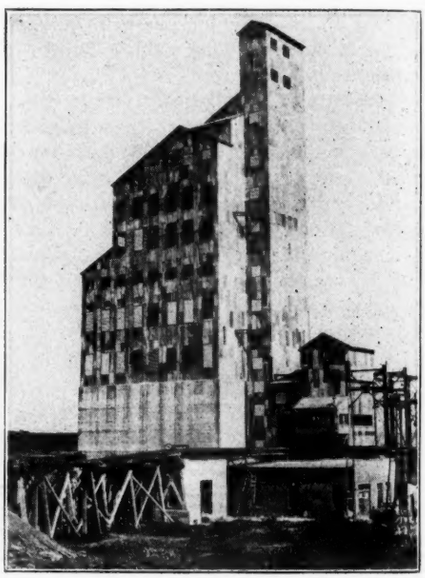
ONE OF THE MOST INTERESTING stone-crushing plants in the world has recently been placed in operation near St. Vincent de Paul, just outside of the city of Montreal, Que. It embodies some very new and original ideas. The plant is owned by the Laurin & Leitch Engineering and Construction Co., Ltd., engineers and contractors of Montreal and was designed for them by the J. C. Buckbee Engineering Co., Chicago, Ill.

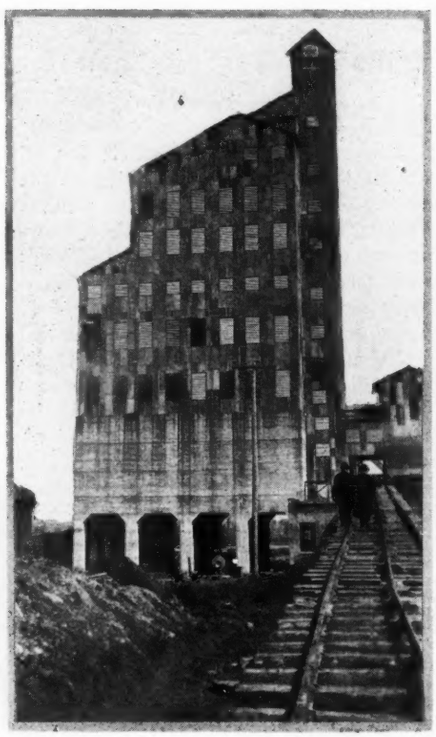
Steel Throughout

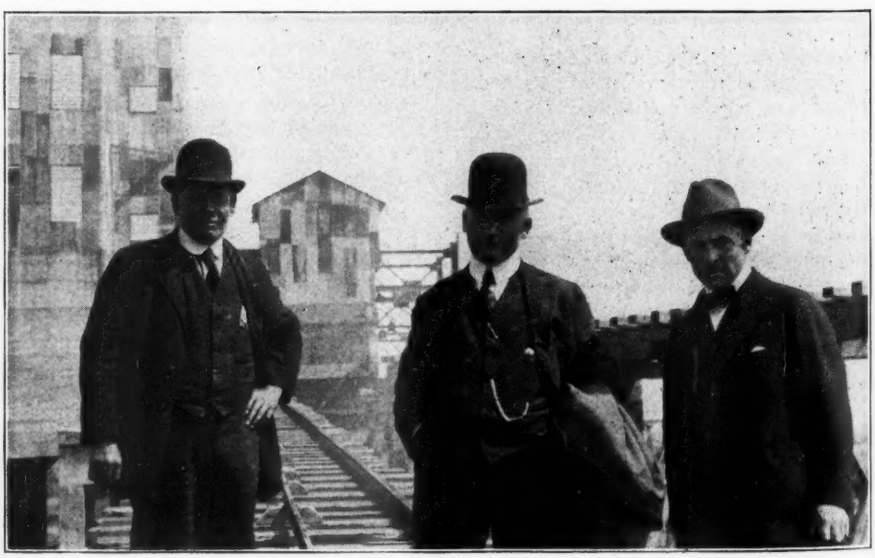
The plant is constructed of steel entirely, the only exception being the reinforced concrete bins, which are temporarily lined with wood (to be permanently lined with steel plates), and foundations and the wooden louvers of the windows. The main structure is 208 ft. tall, built of structural steel with corrugated iron siding for walls. The floors, stairways and all interior fixtures are steel.

Although the structure is perhaps the tallest in the crushed-stone industry one









Three views of the new crushing plant of the Laurin & Leitch Engineering and Construction Co., near Montreal, Que.—From left to right, Messrs. Greffe, superintendent, James Laurin and J. E. Laurin

does not need to climb to its top via stairways, for this plant is equipped with a combination freight and passenger elevator which runs to the top of the structure. These are only a few of the details which show how widely this plant departs from previous practice in crushing-plant design, and how much nearer the ideal of a regular factory it approaches.

The plant is located adjacent to the Canadian Pacific Ry.'s main line to Quebec. Leading from the main line is a siding running first over a track scale, then into a ladder spreading out into four loading tracks running under the storage bins, with additional tracks leading out into the storage yard and shops, the tracks under the bins being provided with sufficient grade so that the cars may be spotted under the loading bins by gravity.

Quarry Operation

At the time the accompanying views were taken (in May) the quarry was just being opened. The quarry lies to the south and east of the plant (the opposite side from the Canadian Pacific tracks). Deep-well blast holing is employed and the stone is loaded in the quarry by means of 90-ton steam shovels.

Transportation to the crusher is by means of a third-rail electrically operated railway, constructed on the Woodford system of central control, which permits one or two operators in a central tower to control all the cars in the system. The cars used are 8-cu. yd. side dumping.

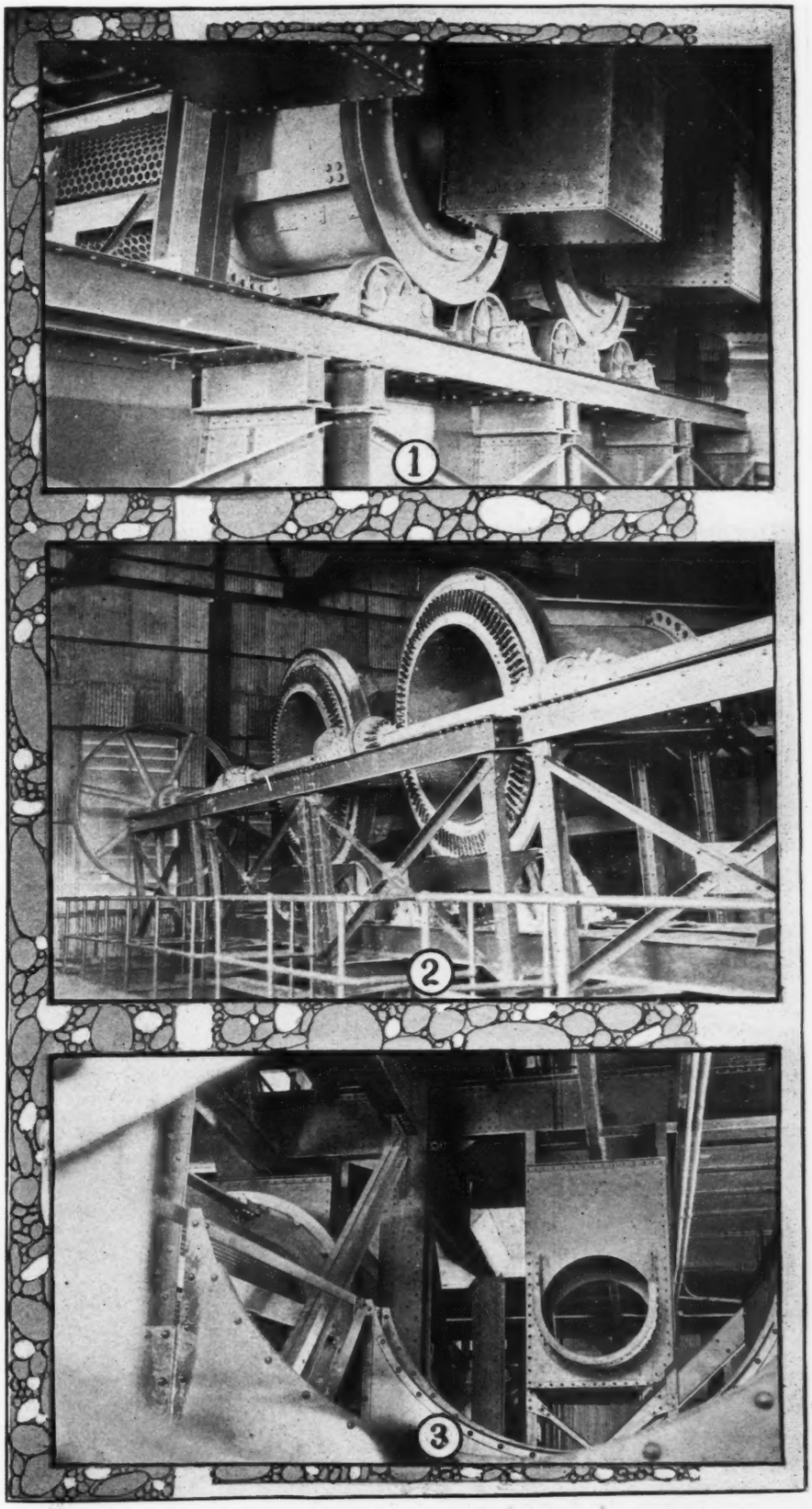
The cars operate in and out of the plant on a loop which runs through the crusher building. The loaded cars come from the quarry up a slight grade to an elevation of 25 ft. above ground level at the crushing plant. At the plant they are dumped by an electrically-operated car-dumping device into a 42-in. gyratory crusher set to 5 in.

Crushing Plant

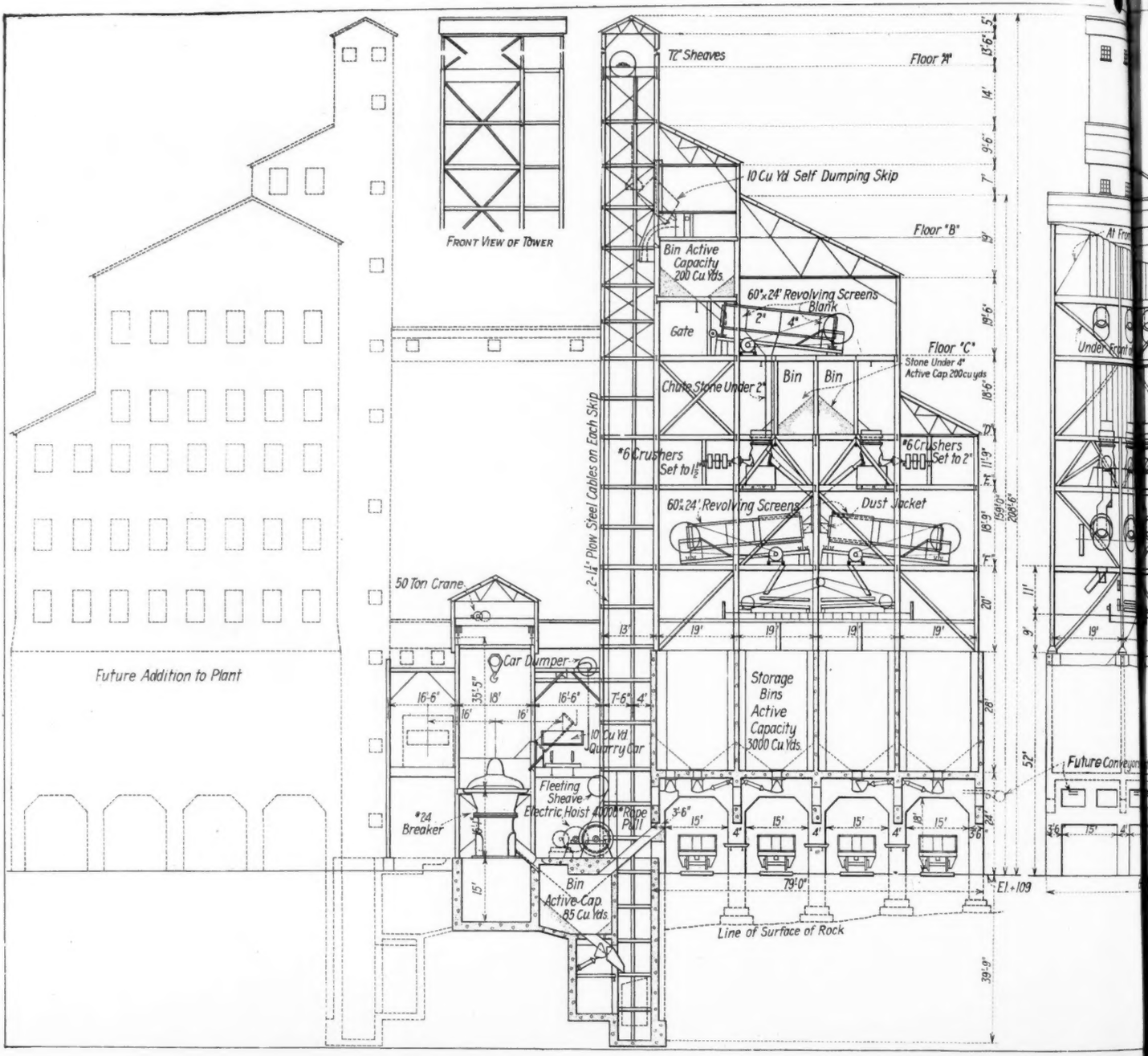
The crusher is set on one side of the track and the screening plant on the other. The layout is such that the crusher can be made to serve a plant of double the present capacity of 4,000 tons per day. The present screening plant can be duplicated on the opposite side of the crusher, as shown in the double-page elevation and plan accompanying this article.

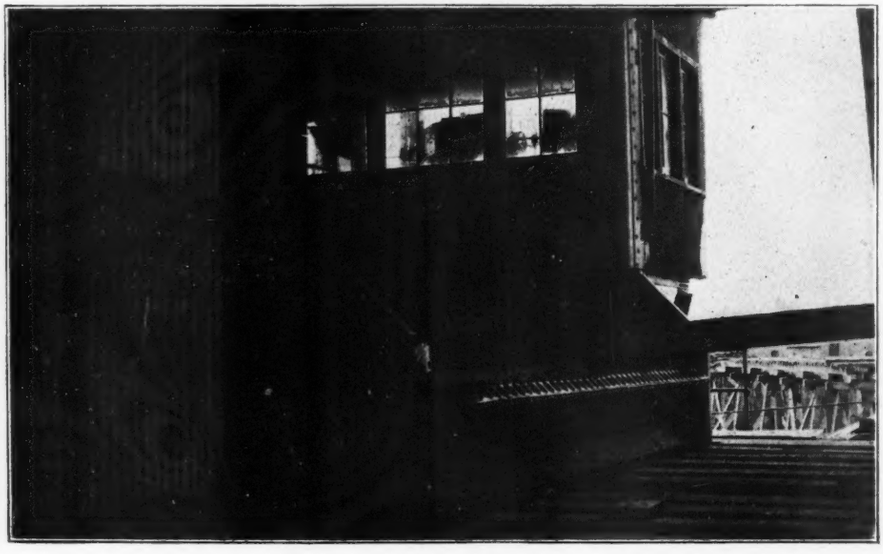
The crusher is operated by a 200-h. p. induction motor and is located in one end of a 76-ft. steel structure served by a 50-ton overhead traveling crane, electrically operated. This crane is capable of handling any crusher part and sufficient room is provided under the same roof to layout and work on any or all the crusher parts.

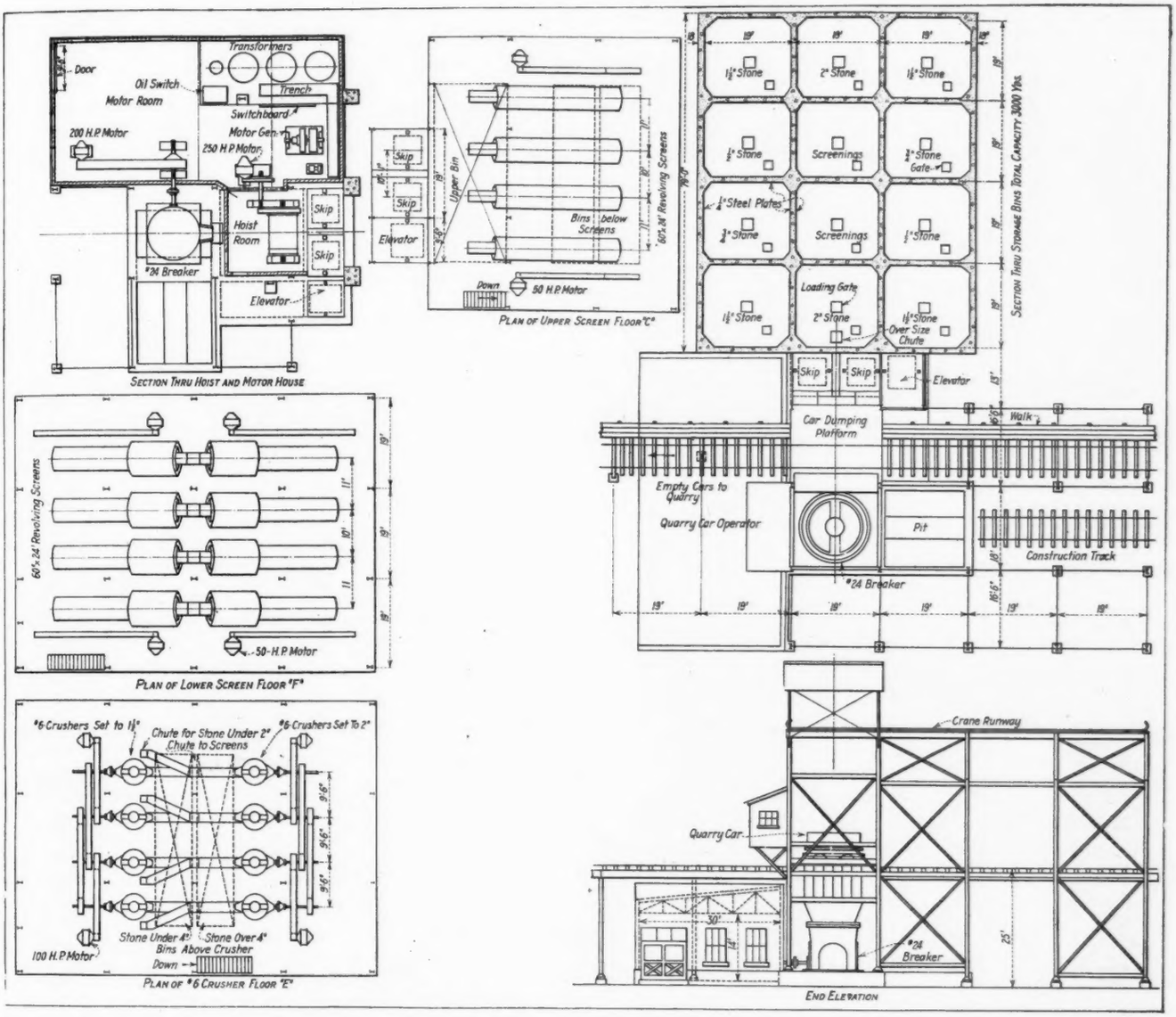
The crushed stone leaving the crusher falls into a concrete bin of about 80 cu. yd. capacity, under the quarry-car track. The stone is fed out of this bin by gravity through compressed-air controlled gates one or the other of two balanced 10 cu. yd. skips. The skips are operated in vertical shafts by a 250-h. p. electric,



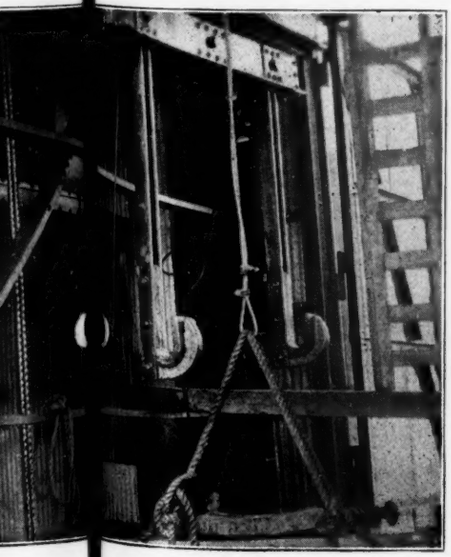
Structural details of screens and settings: (1) Feeding end of primary screens; (2) Screen drives in pairs; (3) Feeding arrangement of secondary or lower battery of screens. These screens are end to end

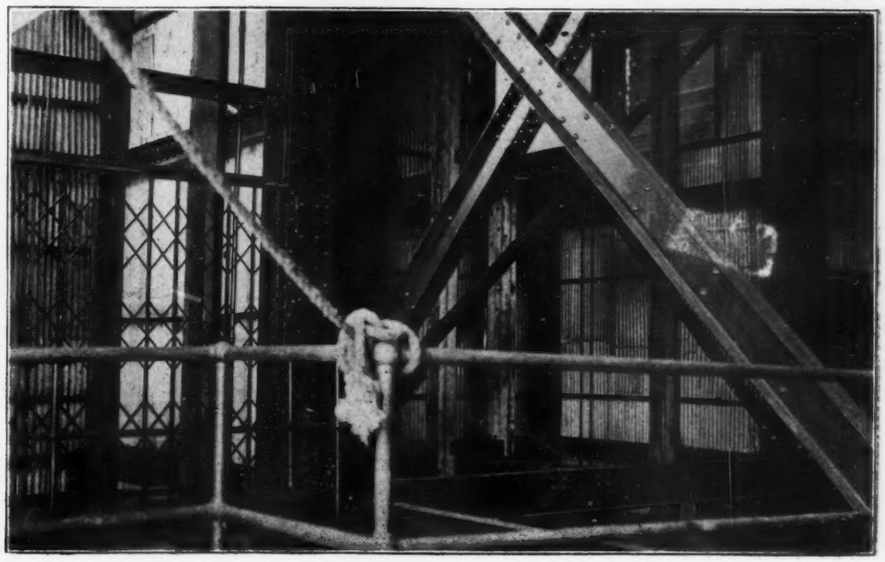

72" Sheaves
Floor "A"
10 Cu Yd Self Dumping Skip
Floor "B"
Front View of Tower
Bin Active Capacity 200 Cu Yds
60"x24" Revolving Screens Blank
Gate
2"
4"
Floor "C"
Stone Under 4" Active Cap 200 cu yds
Chute Stone Under 2"
Bin
Bin
#6 Crushers Set to 1½"
#6 Crushers Set to 2"
60"x24" Revolving Screens
Dust Jacket
2-1¼" Plow Steel Cables on Each Skip
50 Ton Crane
Car Dumper
Future Addition to Plant
Storage Bins Active Capacity 3000 Cu Yds.
10 Cu Yd Quarry Car
Fleeting Sheave Electric Hoist 40000# Rope Pull
#24 Breaker
Bin Active Cap. 85 Cu Yds.
79'0"
El+109
Line of Surface of Rock
Future Conveyor System





Details of Laurin & Leitch plant showing layout for duplicating facilities. Below, from left to right—(1) Big crusher setting; (2) Car dumping device; (3) Passenger elevator shaft



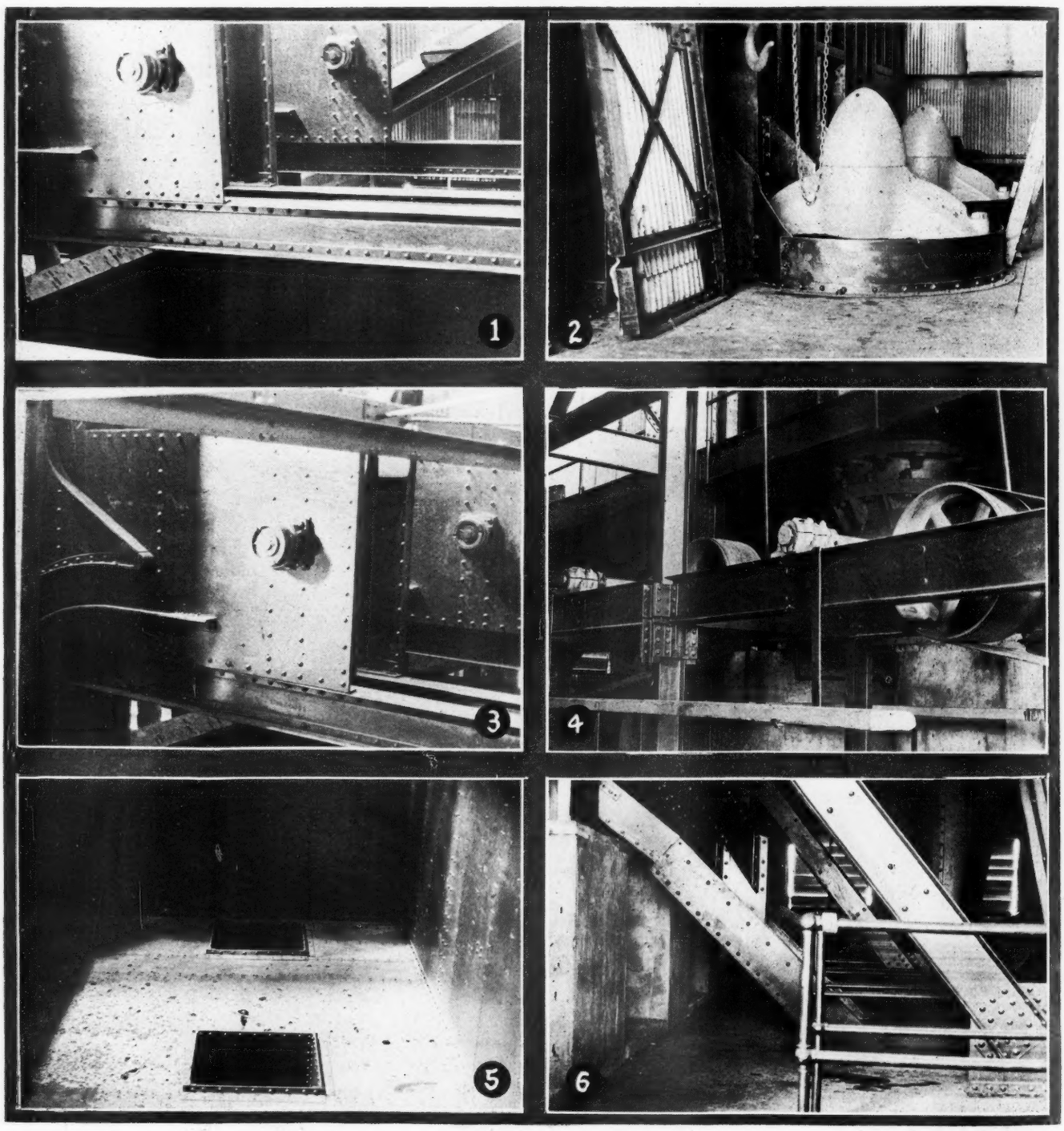


motor-driven hoist. The hoist and motor are between the initial crusher and the skipway. These skips are operated at a speed of 300 ft. per minute and raise the stone to a height of approximately 200 ft., where it is automatically dumped into steel storage bins of about 200 cu. yd. capacity. These bins are at the top of the plant and the skip hoist does the only elevating or conveying that is necessary in the entire flow of the material through the plant.

Screening Plant

From the storage bins the stone falls into four 60-in. by 24-ft. revolving screens. Each pair of screens is driven by a 50-h. p. induction motor. These screens are provided with 2-in. and 5-in. perforations resulting in giving three sizes of material. The material under 2 in. falls through a chute to the sizing screens below. The material under 5 in. falls to a 200-cu. yd. bin serving four No. 6 recrushers to make a 1½-in. product, while the material over 5 in. falls to a second 200-cu. yd. bin serving another battery of four No. 6 recrushers to make a 2-in. product. Each pair of No. 6 crushers is driven by a 100-h. p. induction motor, and friction clutches are provided on all crushers so that any one of them may be started or stopped independently of the others.

The product of all the No. 6 crushers goes by gravity steel chutes to eight 60-in. by 24-ft. revolving screens, placed end



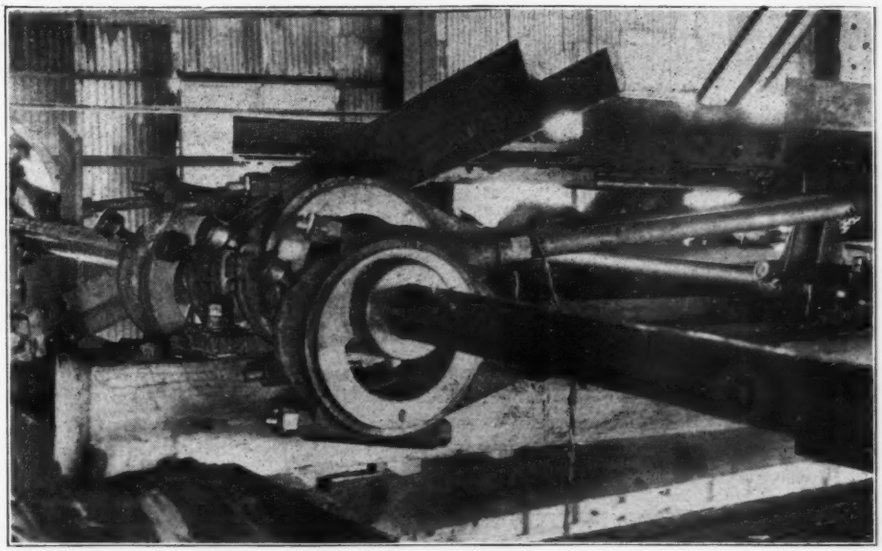
Structural details of plant: (1) Skip dumps at bins in top of plant; (2) Recrusher settings; (3) Another view of skip dumping frames; (4) Recrushers from below, showing drives; (5) Feeding bin for plant; (6) Steel chutes from recrushers to screens below

to end in batteries of four. These screens are driven in pairs by 50-h. p. induction motors, as already described in the case of the scalping screens. The sizing screens are provided with ¾-in., 1½-in. and 2-in. perforations, and with a ½-in. dust jacket, resulting in the production of five sizes of stone, these falling through steel chutes to the concrete storage bins below.

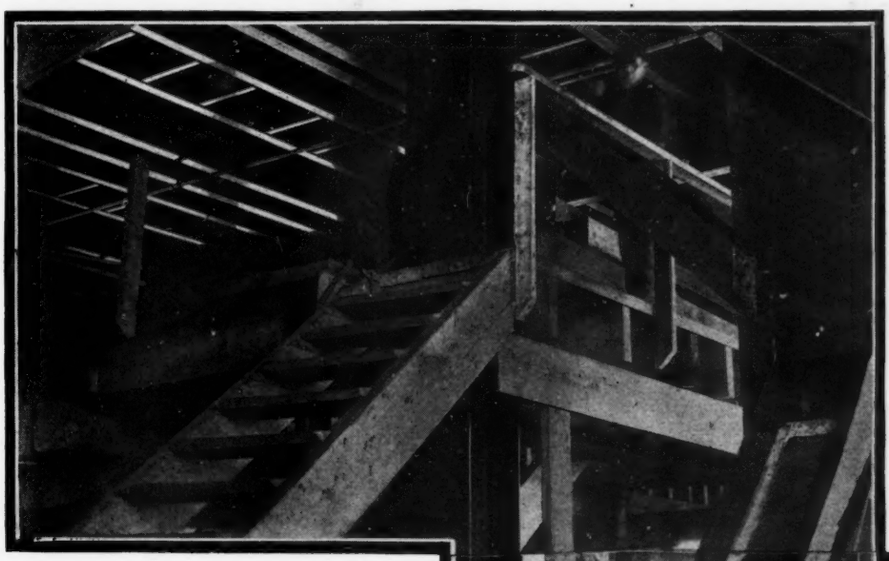
The smaller sizes of stone and the dust are rescreened through a battery of reciprocating screens placed on an island platform over the concrete storage bins. These screens are operated in pairs by balanced eccentrics which prevent excessive vibration.

All the screens and screen drives are of special construction and are different from any hitherto installed. They were constructed upon designs made by the J. C. Buckbee Engineering Co.

The concrete storage bins have an active capacity of about 3,000 cu. yd., and under them run four loading tracks.



Balanced eccentric for driving shaker screens, which are on an island platform over bins shown in the view below



Suitable undercut gates operated by hand levers are provided in the bottom of each bin for controlling the flow of stone into the railroad cars.

Special Features

In addition to the 50-ton traveling crane in the crusher house, already referred to, I-beam crawls or crane-hoists of suitable capacity are provided over all the screens, secondary crushers and all other principal machines.

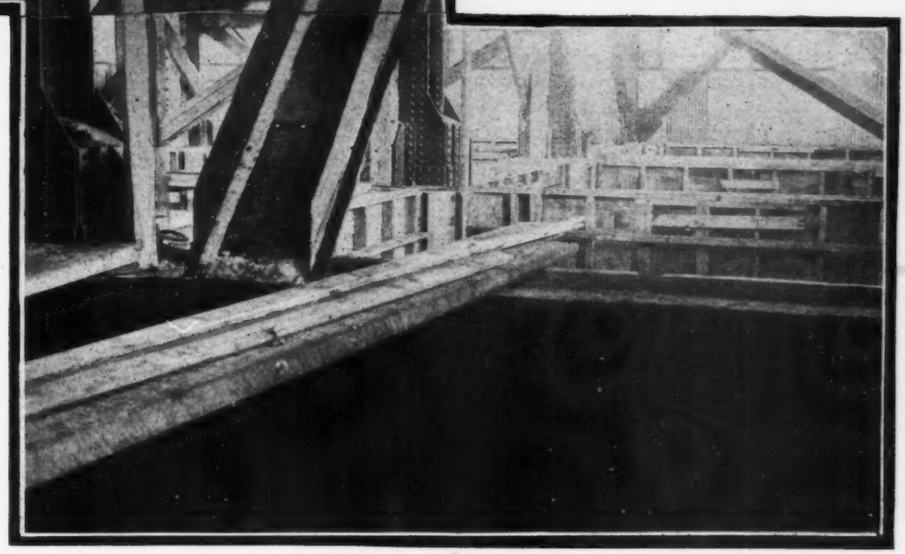
Parellel to the two main skipways is an electrically operated passenger and freight elevator with a 6 by 6-ft. platform for lifting employes and repair parts to the various floors of the plant, while suitable stairways are provided leading from the ground level to the topmost part of the plant.

Provision has been made in the plans for the installation of conveyors for piling the product of the plant in ground storage to any capacity that may be desired, and it is expected that a ground storage of 100,000 yds. will be provided in the near future.

Windows have been plentifully supplied in all parts of the plant. These are covered with shutters of the louver or folding-blind type, which give light and ventilation in the working season and weatherproof protection in the winter. All parts of the plant where it is necessary for a man to go for accessibility to machinery or inspection are completely floored over, and all openings and machine parts in motion are protected by iron-pipe railings.

Power Plant

Electric power is purchased from the Public Service Co., of Montreal, and the



Island platform and shaper screens with concrete bins below. Note headroom under lowest screen floor, permitting access to any bin; and the light at the tops of the bins

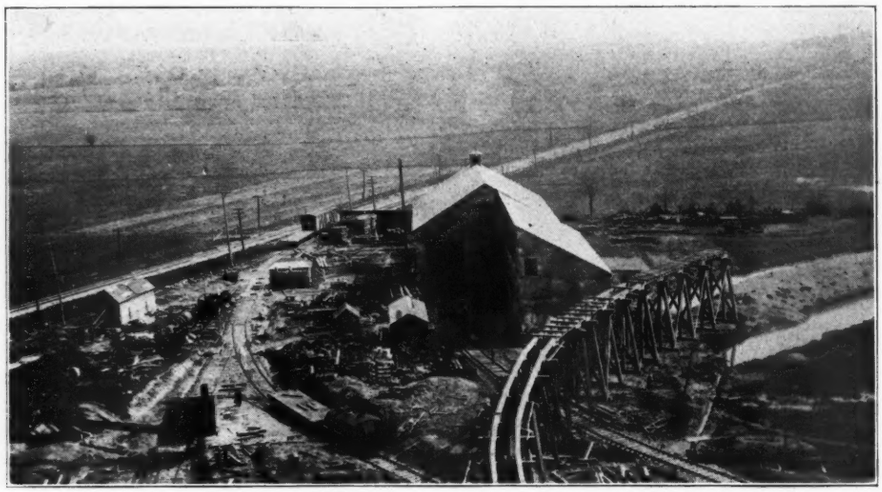
transformers and switchboard together with the motor generator set for supplying direct current to the Woodford haulage system in the quarry are located in a concrete block-walled, steel-roofed building just to the south of the 42-in. crusher and the skipway. In this building are also located the 200-h. p. motor driving the big crusher and the 250-h. p. motor driving the skip hoist, as well as the electrical repair shop.

The section of plant described above has a capacity of about 4,000 cu. yd. per 10 hours, with the exception of the 42-in. crusher, the capacity of which is double that. It is the intention in the future to erect a second unit similar to that described to the east of the main crusher, the product of which will then be divided equally between the two sections of plant and give the entire installation a capacity of 8,000 cu. yd. per 10 hours.

Designers and Builders

The plant structures, other than the foundations and storage bins, are of structural steel furnished by the Dominion Bridge Co., and erected by the Laurin & Leitch Engineering and Construction Co., Ltd.'s, forces under the immediate supervision of J. E. Laurin, son of James Laurin, member of the firm, and general manager and chief engineer. The superintendent of the plant in charge of operation is M. Greffe.

As already noted, the plant as a whole was designed by the J. C. Buckbee Engineering Co., Chicago, Ill.



Shop building of the Laurin & Leitch crushed-stone plant

No More Advanced Rulings on Corporation Income Tax

WASHINGTON, D. C.—The Bureau of Internal Revenue will answer no more hypothetical questions, give any informal rulings in advance of the consummation of the matter involved, or decide whether proposed transactions will result in the realization of taxable income. Experience during the past year has shown that this service can not be rendered beneficially either to the public or the bureau, as many proposed transactions work out in a way not contemplated at the time they are planned.

Officials of the bureau, in announcing this decision, asserted that taxpayers considering the reorganization of corporations have frequently asked whether their contemplated plans will result in taxable income, and it is believed that the decisions thus informally received have frequently resulted in a change of plan so as to avoid taxation.

The Commissioner of Internal Revenue, it is declared, is not required by law to decide any particular case in advance of its actual presentation of the facts for a decision, and the policy hereafter will be that the transaction must be completed and not merely proposed or planned; the complete facts relating to the transaction, together with abstracts from contracts or other documents necessary to present the complete facts must be given, and the names of all real parties interested (not "dummies" used in the transaction) must be stated regardless of who presents the question, whether attorney, accountant, tax service or other representative.

"In the interval between an informal advance decision and the time when the case is finally presented for actual decision, developments may occur which affect the decision," it was pointed out. "When a question is actually presented in the regular course of administration for the decision of the commissioner, the decision must then be in accordance with such light, whether from experience or from judicial decision, as he may then have. Any taxpayer who had relied on an advance decision would necessarily be prejudiced whenever the final decision did not agree with the advance decision. The fact that taxpayers asking for advance decisions are usually unwilling to accept an oral opinion shows that taxpayers are intending to rely on such advance decisions, and are likely to be misled by them if change later becomes necessary.

"It is also a matter of practical experience that when facts are presented for advance decision it is practically impossible to present the same facts as will afterwards come up in the regular course for actual decision. Reorganization plans, for instance, when they actually work out, may be changed in some particular which the taxpayer regards as unimportant, but which in fact may be decisive of the case.

"It is realized that the uncertainty which exists in the minds of business men as to the construction of various parts of the law is unfortunate and tends to hamper business development, but since such uncertainty can be resolved only through decisions of the course, and since an advance decision by the commissioner is not a real but only an apparent resolution of the uncertainty, it appears that in giving such advance decisions the commissioner would be doing the taxpayer an injustice rather than a favor."

Illinois Farmers Find Way to Solve Limestone Distribution Problem

THE PROGRESSIVE FARMERS of Effingham, Ill., have recently perfected an organization called the Effingham Limestone Association, by adopting a well-defined constitution and by-laws. Prior to this time all the agricultural limestone business was transacted through committees with the banks of the city supplying the statements. Under this new organization the business is conducted by an executive committee, and the handling of the limestone is placed through the regular channels of business. The banks are encouraging this by furnishing money for keeping a supply on hand, charging the association no interest.

The membership in this association is well defined: "Any citizen or land owner of the community of Effingham shall be eligible for membership. The dues shall be $5 for the membership the first year. Yearly dues thereafter shall be $1." The amounts subscribed for the building of the storage shed were credited to membership and yearly dues.

The price of limestone to each member is as follows: Price per ton, f. o. b. car Effingham, plus unloading charges per ton, plus 5 cents per ton shrinkage for limestone; or 50 cents per ton for raw phosphate rock, plus selling agent's fees when such articles are taken from the warehouse. If taken directly from the car there is no unloading cost. To a non-member of this association the price is 25 cents a ton on limestone, and $1 per ton on phosphate rock.

Texas Trap Rock Deposit Recently Discovered

Origin and Character of Pilot Knob Deposit Near Austin — Road Improvement Program Offers Chance of Big Development

AUSTIN, TEXAS.—With a road building program in progress in Texas that calls for an expenditure of more than $130,000,000, provided the pending state bond issue of $75,000,000 for that purpose is voted, much attention is being given to the development of materials for highway construction. In this connection it is pointed out by Dr. J. A. Udden, director of the Bureau of Economic Geology and Technology of the University of Texas, that the huge quantity of nephelite basalt, commonly known as trap rock or limbergite, which has been found at Pilot Point, ten miles southeast of Austin, is the toughest and hardest rock in Texas. The entire dome of Pilot Knob is composed of this igneous rock. Arvid Frank of San Antonio, geologist, declares that it will become the source of most of central Texas road surfacing material if developed.

Mr. Frank states that he has the capital at hand to build a crusher which will turn out 2,000 tons of crushed rock daily if a railroad is built to this point from the International and Great Northern tracks, which pass within six and one-half miles of Pilot Knob.

The formation is rare and was first brought to light about six years ago by the Bureau of Economic Geology at the University, which analyzed the rock and called attention to its quality. Several speculators have visited the deposit, and for several years a big trap rock concern held a lease upon Pilot Knob, but abandoned it with the oncoming of war and the impossibility of extending a track to the site.

Probable History of Formation

Dr. Udden gives an interesting history of the trap rock formation. Austin is built upon what is called a faulted area. This faulted ground begins on the Rio Grande near Uvalde and runs in long parallel fissures near San Antonio, thence to Austin and on to Waco. It also extends from Waco to the Ozark Mountains of Arkansas, but is poorly defined beyond Waco.

These fissures were formed by the breaking away and sinking of the ground which lies on the lower side. The opening of these fissures in the distant past allowed the molten rock beneath to boil up through the earth in volcanic formations. These molten flows did not break through to the surface but boiled upwards and spread in horizontal fissures approximately 1,000 ft. below the surface of the earth as it existed at that time. This subterranean volcano, shaped like a mushroom with its long stem running deep into the bowels of the earth, cooled and hardened for ages. In the meantime, the surface of the earth was gradually worn away and finally the dome of what is now Pilot Knob was exposed.

The original body of nephelite basalt was much larger than the present deposit. Ages of water absorption has turned the more exposed layers of it into what is commonly called "serpentine" rock. This soft substance now exists around the core of trap rock. Dr. Udden estimates that this core of basic rock is about half a mile across and probably 700 ft. deep. His estimate of the depth is based upon the log of an oil well which was sunk through the serpentine rock a short distance from Pilot Knob. Somewhere under this deposit exists the fissure up through which the molten rock boiled in ages past. This probably runs 10,000 ft. into the earth.

Crushing Strength

A pressure of about 45,000 lbs. per square inch is required to crush this rock. Various rocks have been picked up on the surface and have been crushed at varying pressures of 34,000 to 52,000 lbs. per square inch, some of them being tested in the university laboratory. Since the top layers are more likely to have a bigger portion of serpentine substance, it is very probable that the rock found underneath the surface will have an average of about 50,000 lbs. crushing resistance. The famous Uvalde trap rock crushes at 34,000 lbs.

The specific gravity of the trap rock at Pilot Knob, according to university laboratory tests, is 3.12; the weight per cubic foot is 199 pounds; the water absorbed per cubic foot is 0.21, and the "percentage of wear" is 1.7. James P. Nash, formerly testing engineer for the Bureau of Economic Geology, says of the Pilot Knob trap rock:

"This is a very hard rock, of very high hardness and toughness. It has good cementing qualities and very good resistance to compression. It is an excellent material for surfacing heavy traffic roads, also for concrete, aggregate of railroad ballast."

At only three points in Texas are igneous rock formations prominent. One of these is of granite.

Is Government Construction Equipment Kept Out of the Market?

THE ALLEGED POLICY of construction machinery manufacturers toward Government-owned construction equipment is vigorously attacked in a letter received by ROCK PRODUCTS from the president of a large Michigan sand and gravel producer. The substance of the letter is printed below and the editor of ROCK PRODUCTS would be glad to hear from other readers, both producers and machinery men as to what they think about it.

"It is the policy of the locomotive crane builders and the motor truck builders to attempt to persuade the government to hold equipment off from the market, or to hold the prices on this second-hand equipment so high that it will not move. I think this policy is an error. So long as this equipment is not absorbed it would seem to me it is a menace to the trade, as for example—we had two locomotive cranes, one we sold to an equipment broker, the other was commandeered by the Navy Department.

"Now, we do not replace this equipment. Why? The only answer is psychological, we stand pat to see what will happen with the idle cranes owned by the government. Now, how many prospects for purchasing equipment are doing the same thing? We know that ultimately the government will dispose of this surplus equipment. The manufacturers have enjoyed their profit on the equipment, and it seems to me they gain nothing by attempting to persuade the government to hold the equipment off the market.

"There are a very considerable number of sand and gravel producers and crushed stone producers who would purchase a locomotive crane at a price that the government ought to sell this second-hand equipment for, who will not purchase it at the price new equipment is held at. Thus if all the resistance is withdrawn and the government sold this equipment at a price that would move it, no matter what the price might be, the equipment would soon be absorbed and there would be many purchasers of locomotive cranes who never will be prospects for buying a new machine. They are small operators who could afford to pay $8,000 or $9,000 for a machine that never would pay $18,000 or $20,000, and if they purchased a crane from the government they would probably keep it and it would be out of the way of real prospects in the future.

"What I say in reference to cranes is likewise true in reference to motor trucks. I think you ought to point out to manufacturers that they are standing in their own light.

Lime Manufacturer on Which To Use—Lime or Limestone?

Unbiased Opinion from the Producer's Own Farming Experience Covering a Period of 35 Years

FOR THE PERIOD OF 35 YEARS, since 1882, the writer has been exclusively engaged in the manufacture and sale of commercial lime and limestone; the limestone burned in kilns by modern processes producing quick lime for building, chemical and agricultural purposes. At all times while so employed, I have had farming lands embracing areas of five hundred to a thousand acres, under my supervision.

In the early '90's I became convinced that all land would be benefited and stimulated, as well as to some extent fertilized, by the use of lime; the burned lime only being then considered. I found that the use of lime in agriculture by its application in the form of lump lime had been the custom in England, France and Germany for centuries; and in the Eastern States of the United States, especially in Pennsylvania, Maryland and Virginia, since early in the 18th century. The writer was a personal witness of lump lime application to land in Maryland in 1863; and we note that soon after the close of the civil war, General Robert E. Lee in a letter to his son in New Kent County, Virginia, undertaking to rebuild his shattered fortunes by engaging in the pursuit of agriculture, advised him strongly to reserve as liberal funds as possible to purchase and apply lime to the worn Virginia lands, to restore them to productivity.

Literature pertaining to agriculture, both at home and abroad, has afforded abundant material for profuse production by eminent scientists, chemists, and other authors during all these periods, giving accessible information upon all points relative to the use of lime in agriculture. Strange to say, the simple proposition for the use of lime to correct acidity in soils, was unknown until a comparatively recent period. So it can be readily understood that all authorities were in a measure groping in the dark. With abundant land areas and plenty of lime resources, and with capital behind the enterprise, the writer undertook a series of experiments in the use of lime application to land, for the purpose of increasing the demand for lime by unlocking by practical tests the secrets of Lime and the Land.

Our experiments with fresh burned lime and air-slaked lime, gave us results as follows: A single application of lime where five to ten tons per acre when plowed under, gave us immediate results in increased crops of all kinds, stimulating the land to increased productivity for a period of nine to eleven years. There were no injurious effects, whatever, discovered, although we early began to use our barnyard manure in connection with lime, which we since have learned is the correct method. Without as yet information that lime was an acid corrective, we did note that our clover crops in our regular and usual rotation, were enormously increased; therefore, being fully aware that if we could raise large crops of clover, we could be assured continued and renewed fertility. It will be seen that we had stumbled upon the cure for acidity, without knowledge of the facts; afterwards came the revelation.

When Cost Accounting Results in Loss

IMPROPER METHODS of cost accounting result in loss. Underestimating costs by an ill-informed contractor or manufacturer may make him the successful bidder; he loses by his success and his competitors also lose because they fail to obtain the business on a paying basis.

In a number of trades, leading men who have established proper cost systems have found it profitable to educate their competitors in cost accounting in order to prevent unintelligent and ruinous competition.—National Federation of Construction Industries.

Soil depleted of its productive power, incapable of reasonable crop returns, which cannot produce clover, is acid. Acidity is the cause of the conditions mentioned, and acidity of the soil can only be corrected and removed by the application of lime. How wonderful the revolution thus accomplished. The world is saved. No more shall scientists busy themselves with conclusions as to the time when famine shall stalk throughout the wornout earth and all peoples shall perish.

"How wonderful are Thy works, O Lord! How beautiful, Thy Divine Providence! for now forever seed time and harvest shall surely come."

Our conclusions determined by constant investigation for a period of thirty-five years, indicate that lime and limestone applied to land should be in amounts as follows:

To correct acidity: Apply two tons ground limestone per acre, or one and one-third tons hydrated lime, or one ton of fresh burned lump lime, or two tons of air-slaked lime; the latter not leached by exposure. Above applications to be made every four to five years.

To correct acidity and at the same time stimulate the soil to renewed productivity: One and one-half tons of hydrated lime; or 1¼ tons of lump lime per acre every five years.

If it is desirable to secure results for a longer period, increase the amount at one application, but not beyond a ten-year period.

Now, as to which it shall be. Farmers are confused upon this point because each manufacturer endeavors to prove, and claims that his particular brand of lime or limestone is the one and the only one fit to use. In our experience, if you are not in a hurry for results, if you are willing to await the slower action of limestone, there is not much choice. If you wish immediate results and want crop returns by stimulation, then use the fresh burned lump lime or hydrated lime. Limes of Ohio are seldom alike; each quarry has its particular analysis. We have found 45 to 92 per cent. carbonate of lime with 40 to 5 per cent. carbonate of magnesia in the various limes manufactured by us, and have finally decided in favor of lime showing an analysis of two-thirds carbonate of lime and one-third magnesia, silica, etc. We much prefer to use hydrated lime in paper bags to lump lime on account of labor saving. Lump lime will not keep; it air-slakes very soon. Hydrate can be ordered for winter delivery and be stored until required, thus avoiding delays and uncertainties.

As we manufacture and deal in all lime and limestone products in all forms, we can certainly claim to be unselfish in our attitude, and therefore fair in our presentation of this our story. This has been our wish and endeavor.—The White Sulphur Lime & Stone Co., Geo. B. Christian, Pres., Marion, Ohio.

Calcareous Marl Finds Increasing Use in Agriculture

CALCAREOUS MARL, a variety of carbonate of lime, is finding increasing use in agriculture as a soil sweetener. According to the United States Geological Survey, Department of the Interior, 78,232 tons were sold for this purpose in 1918, compared with 73,900 tons in 1917 and 58,088 tons in 1916. The value in 1918 was $261,082, 58 per cent higher than in 1917. Besides that sold for agricultural use, 20,462 tons, valued at $57,582, was sold for the neutralization of acid waters, etc.

The marl represented in this statement includes two kinds—fresh-water marl, or ooze, taken from the bottoms of lakes, ponds, or swamps, and marine marl, or coquina, taken from deposits of partly consolidated masses of shell fragments deposited on the bottom of a shallow sea and later elevated above sea level. Fresh-water marl was produced in 1918 in Virginia, West Virginia, Pennsylvania, and New York; marine marle in North Carolina and South Carolina.

Spreading the Gospel

A FORTY-PAGE BOOKLET entitled "Dollars and Sense," has just been issued by the National Agricultural Limestone Association, 405 Hartman Building, Columbus, Ohio. It would be difficult to describe it as other than "Sandles-esque."

It is brimful of scientific data and argument, but these are dished up differently from any previous treatment of the subjects. The personality of Secretary A. P. Sandles shines in every line. Witness the following from page 4: "The Limestone Primer."

"Question—Why is agricultural limestone spoken of as Soil Sugar?"

"Answer—

It sweetens sour soil.
It sweetens sour farmers.
It knocks the acid out of dirt.
It sweetens and fattens pocketbooks."

Or again:

"How can a black cow eat green grass, give white milk and make yellow butter. Limestone." Or the following: "Calcium and magnesium are much more necessary to good crops than soda and salt are to good baking, cooking and eating." Nor are all such epigrams devoted to boosting limestone.

The nearest parallel to Mr. Sandles "Dollars and Sense" the editor knows of is Ben Franklin's "Poor Richard's Almanac." And of the wisdom of its pages and its popularity there can be no doubt.

The *lime* manufacturer will find scant comfort in it, for while there are many generalities of interest on various subjects, on the subject of lime vs. limestone the text is quite specific.

Kind of Lime to Use

THE INDIANA EXPERIMENT STATION has issued a valuable bulletin, No. 213, on the value of lime on different soils. The following is from this bulletin:

"Ground limestone, burned lime, hydrated lime, air-slaked lime, refuse lime and marl may all be used for neutralizing soil acidity. Which of these different forms of lime should be used in any particular case should be determined by the cost at which a given amount of calcium carbonate or its equivalent, in a reasonably fine condition, can be delivered to the soil. Aside from this, there is no good reason for discriminating against any of these materials. Neither should magnesian limestone be considered either more or less valuable than the ordinary calcium limestone.

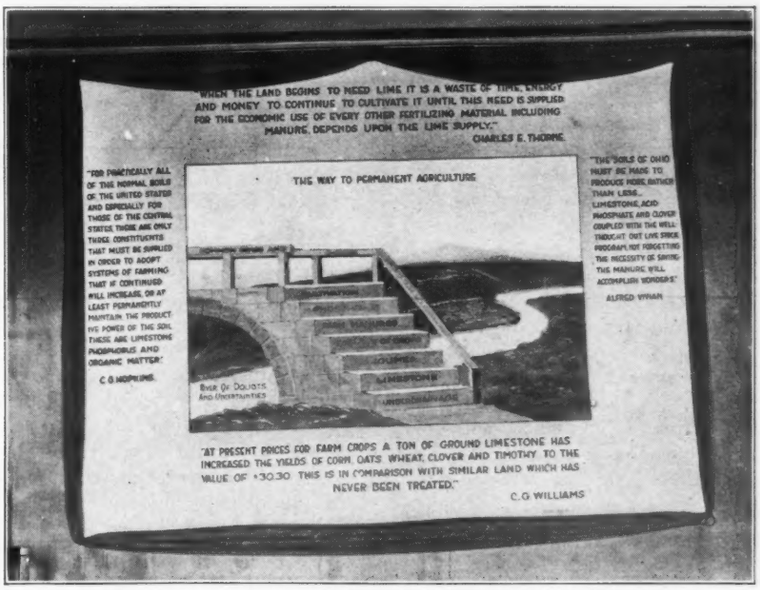
"Theoretically, 100 pounds of finely ground limestone, 56 pounds of freshly burned lime, 74 pounds of hydrated lime and about 90 pounds of airslaked lime have equal acid neutralizing power.

"Usually ground limestone will be the most economical and most satisfactory material to use. A number of concerns all over the state are producing good grades of ground limestone at reasonable prices. In considering the price, the fineness of grinding and the freight rate must be taken into account. The fine material is worth more than the coarse. If coarse material is used, it will require more to get the same immediate acid neutralizing effect. A good grade of ground limestone should be fine enough so that all will pass through a 10-mesh sieve, one-half through a 40-mesh sieve, and one-quarter through a 100-mesh sieve. The objection to coarse material, such as screenings, is that it acts too slowly. Only the fine dust will act immediately.

"If a soil is acid enough to require liming at all, it will pay to apply at least two tons of finely ground limestone to the acre. Some soils may require as much as four tons to the acre.

"After the first application, one or two tons per acre applied every six to eight years will usually be sufficient to keep the soil in good condition."

The bulletin also quotes prices which are so reasonable that any farmer can afford to use it freely on his land.


"WHEN THE LAND BEGINS TO NEED LIME IT IS A WASTE OF TIME, ENERGY AND MONEY TO CONTINUE TO CULTIVATE IT UNTIL THIS NEED IS SUPPLIED FOR THE ECONOMIC USE OF EVERY OTHER FERTILIZING MATERIAL INCLUDING MANURE DEPENDS UPON THE LIME SUPPLY."
CHARLES E. THORNE
"FOR PRACTICALLY ALL OF THE NORMAL SOILS OF THE UNITED STATES AND ESPECIALLY FOR THOSE OF THE CENTRAL STATES THERE ARE ONLY THREE CONSTITUENTS THAT MUST BE SUPPLIED IN ORDER TO ADOPT SYSTEMS OF FARMING THAT IF CONTINUED WILL INCREASE, OR AT LEAST PERMANENTLY MAINTAIN THE PRODUCTIVE POWER OF THE SOIL THESE ARE LIMESTONE PHOSPHORUS AND ORGANIC MATTER."
C. G. HOPKINS.
THE WAY TO PERMANENT AGRICULTURE
LIMESTONE
"THE SOILS OF OHIO MUST BE MADE TO PRODUCE MORE RATHER THAN LESS... LIMESTONE, ACID PHOSPHATE AND CLOVER COUPLED WITH THE WILL TO CUT OUT LIME SPEND PROGRAM, NOT FORGETTING THE NECESSITY OF SAVING THE MANURE, WILL ACCOMPLISH WONDERS."
ALFRED VIVIAN
"AT PRESENT PRICES FOR FARM CROPS A TON OF GROUND LIMESTONE HAS INCREASED THE YIELDS OF CORN, OATS, WHEAT, CLOVER AND TIMOTHY TO THE VALUE OF $30.30. THIS IS IN COMPARISON WITH SIMILAR LAND WHICH HAS NEVER BEEN TREATED."
C. G. WILLIAMS

Effective educational chart for promoting use of limestone

THE ILLUSTRATION above shows a chart which has been used with much success by C. R. Wagner, field representative of the National Agricultural Limestone Association, Columbus, Ohio. This chart has been exhibited at county fairs and used to put punch into lectures before county agricultural meetings.

Mr. Wagner, who devised this design, is a former State Director of Farm Institutes and knows the "direct" method of reaching the farmer's ear and understanding. He is a first-class farmer himself and enjoys the confidence of other farmers. The executive secretary of the association is A. P. Sandles, of the Ohio Macadam Association.

Mississippi Valley Conditions Point to Materials Shortage

Gordon Willis, Prominent Lime Manufacturer, Foresees Nation-Wide Shortage of Construction Materials

ST. LOUIS IS FACING a shortage of lime, sand and other rock products entering into construction work, some of the best posted men in the local trade fear.

Gordon Willis, vice-president and secretary of the Hunkins-Willis Lime and Cement Co., of St. Louis, a past president of the National Builders' Supply Association, who is considered a good deal of a prophet on construction matters, said recently:

"The demand for lime, sand, gravel and building supplies is rapidly getting ahead of the supply in this territory. Of course the chief reason for this is inability to get raw products, which is attributable to shortage of labor and the greatly felt car shortage."

Mr. Willis predicts a lime shortage all over the country. He declares that his plant is filling orders for lime by the carloads in trade territory generally not invaded by St. Louis firms. Mr. Willis' interesting survey of trade conditions and the explanation of the trend of affairs follows:

"Industrial interests, notwithstanding the fact that the prices of building supplies are on the upward trend, are building as never before. An interesting feature of the construction of additional plants in St. Louis is the location selected for the majority of them. About thirty firms, many of them from other cities, have, during the last month or so, purchased sites in the northwestern section of the city, probably because of the sparse population there. The construction of their plants, combined, will cost in the neighborhood of $50,000,000. Numerous smaller interests, whose work amounts to large figures, are also building.

"This increase in business has been so pronounced that in order to take care of the demand for service we have had to make several new additions to our truck and handling facilities. Our men are working day and night trying to keep the trade supplied. That is our sole object at present—to keep the old trade supplied—not looking for new trade.

"I predict a lime shortage all over the country. We are filling orders for lime by the carloads for all parts of the country. Only recently we shipped a few carloads of lime to Denver. One of our East St. Louis customers, whose contract has just expired, inquired whether he should buy by contract or on the open market. The reply was that if he wanted to be sure of having lime during the coming months he had better purchase by contract. All buyers of lime had better cover their requirements immediately for within a short length of time there will be no lime on the open market.

"Our prediction that the building zone law which hampered building operations in the industrial district for a while would be amended has also materialized. This means that those buildings, the construction of which aggregated some $3,000,000, besides the new ones, will be resumed. The modification of the zoning law will permit the construction of many new buildings.

"The problem of truck equipment has grown to a peculiar stage. At present, under the great demand for teams, wagons and motor trucks throughout the city, it would pay us better to hire out all our equipment by the day rather than use it for hauling building supplies. This has caused us to make recent additions to our fleets. But even with the employment of these new additions of $8,000 worth of horses and $20,000 in additional two-ton trucks, we find that it is necessary to work overtime at the yards. The other Sunday I rode down to one of our yards and was surprised to find the force working as on week-days, trying to keep ahead on the orders with which we are swamped."

Record-Breaking Prosperity in Mississippi Valley

Legitimate Producers Likely To Be Handicapped by Fake Promoters of Rock Product Companies

ST. LOUIS, Mo.—That the great increases in the production of the rock products industries and the unprecedented business that firms, engaged in the production and distribution of sand, gravel, lime, stone, and other quarry products have been enjoying, will result in the introduction into the industry of the stock swindler and unscrupulous business man, are some of the rather startling statements made at St. Louis this week by L. F. Ryan, vice-president of the Simms Quarries of St. Louis.

Mr. Ryan has reached these decisions, he says, after a thorough and comprehensive study of prevailing conditions and after a careful resume of what has happened in other industries, resulting from abnormal business which had grown too large for the reliable and honest men in the industry to handle efficiently. Notwithstanding the fact that many dishonest men will soon enter the rock products industries, Mr. Ryan hastens to add that for the same reason many new business houses have been established, many new producers have organized companies that are really bona fide, and that these additions will be a valuable asset in the production business. He said:

"The unprecedented demand for materials which are needed in the movement under way throughout the country to make this year go down in history as the great twelve-month of new construction, as well as one of reconstruction, has been reflected in the sand, rock, gravel, lime and cement industries in St. Louis as well as in cities all over the country, to a very favorable and profitable extent.

"Nearly every producer in St. Louis, operating on the Mississippi River southward, has found it necessary during recent months to make large additions to his facilities for greater production caused by the increase in building activities. Truck equipment, yard and handling equipment, as well as mining, blasting, quarrying and dredging equipment, has been added to many nearby plants and operators of other plants are contemplating doing this in the near future.

"With the nation-wide agitation over the private ownership of workingmen's homes and the 'Own-Your-Home' movement, which, for some unaccountable reason, is waning in the manifestation of interest by the laboring class, the building industries, interdependent always with the rock products industries, has boomed to such an extent that manufacturers are nearing the stage where getting new business is not considered vital—the sole object of the producers is to keep orders from old customers filled.

"It is apparent to me that this shortage of materials will act as a possible stimulant to unreliable and crooked business men to enter our field and to pocket money unscrupulously. A previous example of this is the oil stock swindler.

Can't Strike Production Stride

Ohio Has a Great Deal of Business but a Shortage of Labor and Cars

By Charles F. Trefz
Associate Editor, Rock Products

A RECENT trip through the State of Ohio shows that there are three conditions which are conspicuous generally throughout that State. There is a shortage of labor and cars for transportation, and there is an unusual amount of business. This combination tends to increase the worries of the producer considerably.

It was generally believed that as soon as the men returned from overseas there would be an abundance of labor, but such has not proven to be the case. Such labor as is available is not of a permanent nature, considerable of it being men who live on farms and work only during their slack seasons. One company has established a camp to keep its men on the job and satisfied, another moves men from one plant to another to meet the greatest need. In any event men are not released unless they make themselves such a nuisance that more work can be accomplished without them. It is a common occurrence to see the superintendent running a locomotive, steam shovel or hoist. In some cases he and the office man help on the loading platform.

At but one place was there found an over-abundance of cars. Here the branch line railroad would deliver cars in trainload lots or sufficient quantities for several days at a time. The general situation, however, was such as to hamper business. In most cases where plants were operating under normal capacity it was because of car shortage. Large contracts are being delayed and in several cases have been abandoned because the producer was unable to ship the material as needed.

As a rule it has been the practice for the producing department to send a representative to the sales department to inquire why orders were not forthcoming to consume the material produced. Now the tables have turned and the sales department has its hands full keeping the customers, who are waiting their turn, satisfied, and all the producing department can say is "Don't take so many orders." Orders for all materials, cement, stone, sand and gravel and lime are accumulating faster in the office than they can be handled. Orders ranging from 100 cars or more of material are almost common. If the railroad situation and the labor situation would only become settled, wouldn't the rock products industry be a great old game?

Real Facts About Car Shortage

Rule of the Railroad Administration Is to Furnish Shippers With Not to Exceed 70 Per Cent of Their Car Requirements

THE MATTER OF CAR SHORTAGE is very frankly dealt with in the Weekly Letter of the Lime Association, August 29. Other rock product industries owe the Lime Association a vote of thanks for having obtained from a Government bureau some really specific information. The letter says:

"The Car Service Section of the Railroad Administration occupies an office adjoining the Intensive Loading Section. This fact is one of the greatest consequence to manufacturers who seek assistance in the matter of their car supply.

"Those who have been neglectful of the efforts of the Railroad Administration to encourage maximum loading of cars suffer a severe handicap when it comes to interesting the Car Service Section in furnishing the cars they need. There is the closest co-operation between these two offices of the Railroad Administration and every shipper who asks for help is promptly investigated to ascertain what his custom has been in the matter of maximum loading.

"The general rule of the Railroad Administration at present is to furnish not to exceed 70 per cent of the cars actually needed by shippers, and if manufacturers who are suffering because of the car shortage are securing 70 per cent of their requirements of cars it will be useless for them to seek a more liberal supply through the Railroad Administration office in Washington. Those whose supply is less than 70 per cent of their demands have a good case and can secure relief upon submitting a statement showing their daily requisitions upon the railroads, the number of cars supplied daily in response to their requisitions, and the number of cars loaded out each day. A general statement that they are short of cars is useless as a basis of action here in Washington and the head of the Car Service Section can not and will not act with the Regional Directors of the Railroad Administration unless definite figures are submitted showing the exact situation in respect to the demand for cars and those supplied by days, as suggested before, for a period beginning at least two weeks prior to the date of the request for assistance.

"Much valuable time can be saved by manufacturers who are suffering for cars if this suggestion will be borne in mind and acted on.

"This whole matter has been brought out very forcibly this week by our efforts to secure relief for a member company. The member complained of a lack of cars and through our efforts a supply equal to 100 per cent of his requirements for a period of three days was secured. In the meantime, one of the inspectors of the Railroad Administration looked into the facts and found that, based upon this manufacturer's shipments for the last three months, his car supply was about normal, and that he had been receiving in excess of 70 per cent of his actual demands. The inspector furnished a list of all the cars supplied to this shipper from August 1 to date, showing the weight of shipments, the capacity of the car, the underload in pounds, and the kind of lime loaded into the cars, whether barrel, bulk or bag. Some cars were loaded as much as 70,000 lbs. short, and little or no effort was made during this period of extreme shortage to double or triple load cars, and every opportunity to do so was noted and pointed out to us by the Intensive Loading Section.

"It will be seen, therefore, that relief will be furnished by the Railroad Administration only in cases where the actual facts disclose less than 70 per cent car supply, and it will be seen further that it is impossible to conceal the actual facts from the vigilant heads of the Car Service and Intensive Loading Sections of the Railroad Administration."

New Plaster Representative for Lime Association

MARSHALL C. JACKSON, recently returned from France, has taken up his duties as plaster representative in the Ohio district of the Lime Association on September 1. He succeeds L. L. Kober, resigned. It will be recalled Mr. Jackson served the lime industry in the days of the former Hydrated Lime Bureau, and the manager of the Association expresses pleasure to have him back again.

NEW MACHINERY AND EQUIPMENT

Handling Pulverized Rock Products With Air

AN INDUSTRY which is fast acquiring an international reputation, but one that is probably unknown to most rock products producers, is building up in Cleveland, Ohio. Its name is comprehensive and in some degree explains the purpose of the company—The Dust Recovering & Conveying Co.

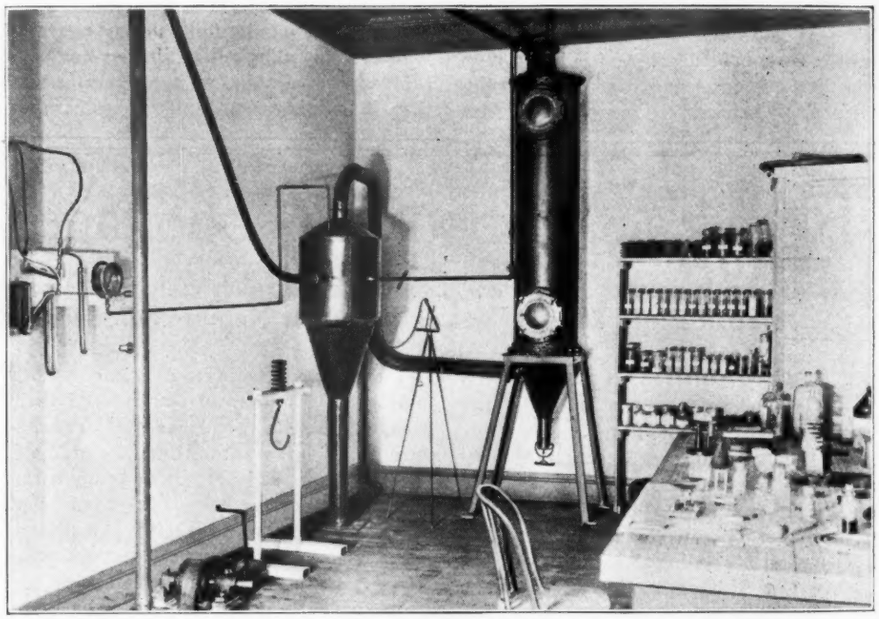
The leading genius in this new industry is F. L. Jorgensen, well known to cement men through his former connection with the Sandusky Cement Co., for whom he worked out many problems in dust collection and waste heat utilization. His associate in the new company is George A. Gieseler. Together they have planned and realized a system of dust recovery and conveying which offers great possibilities in all the rock products industries as well as in many others.

Originally starting out a year ago to tackle problems in dust collection, this company is now giving even more time and effort to dust conveying. And by the term dust has come to mean material as coarse as ½-in. gravel or ⅜-in. iron rivets, or even coarser and heavier material. (The editor saw such material handled at the Cleveland laboratory.)

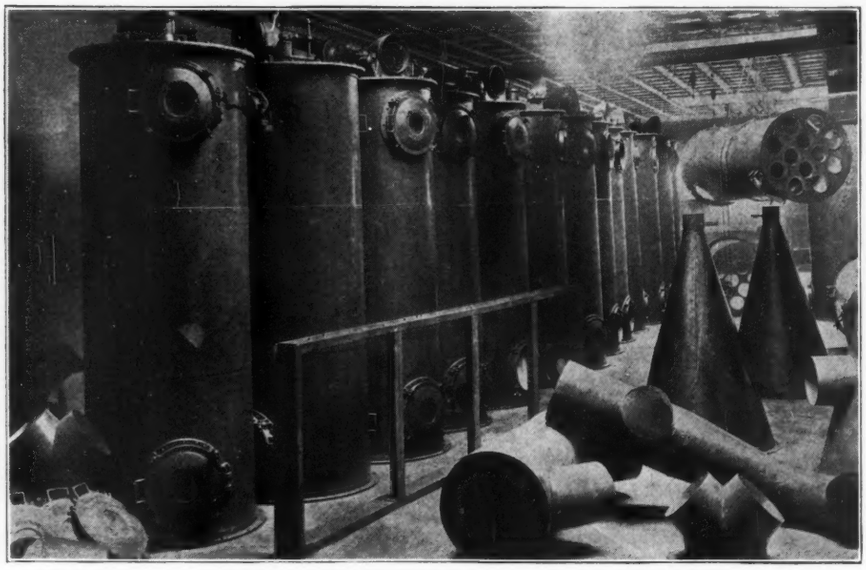
Progress in handling these materials by suction conveyors has reached a stage where about 30 installations are in successful operation. It is now possible for a man to empty a box car of bulk cement, ground limestone, raw rock phosphate or any similar material at the rate of 8 to 10 tons per hour by simply guiding an intake nozzle through the material.

As a labor-saving device in the handling of bulk commodities in the rock products field, such as cement, pulverized or hydrated lime, limestone, phosphate, gypsum, etc., its application is apparently almost unlimited.

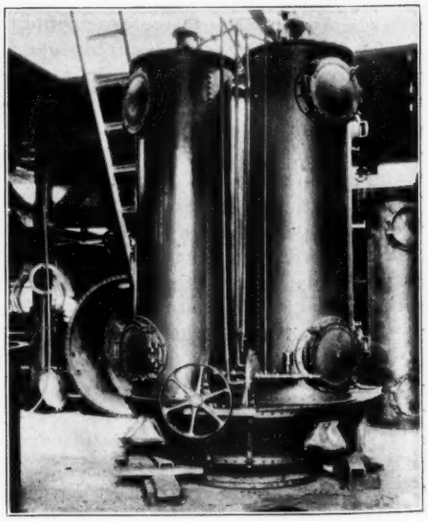
Office and factory



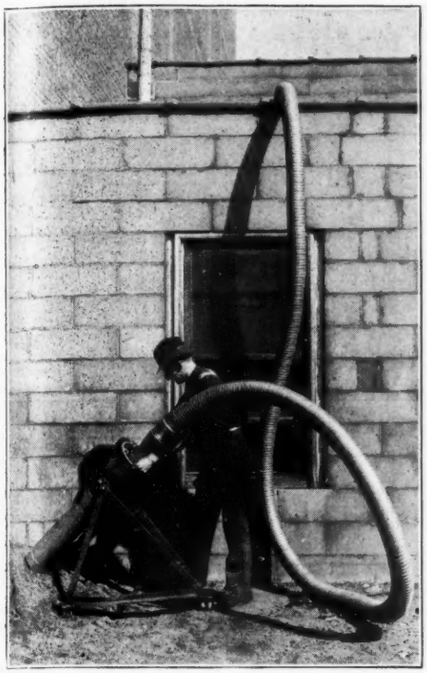
Experimental conveying and filtering equipment, Cleveland laboratory



Row of filters ready for shipment, tested and inspected



Filter unit of 20 tons per hour capacity ready for shipment

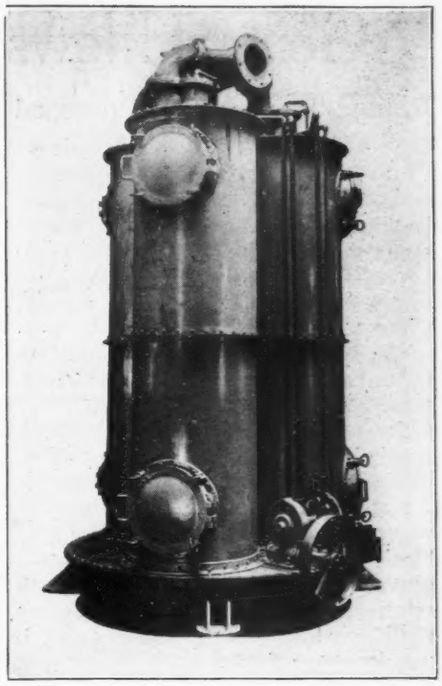


Suction nozzle for picking up 10 tons per hour

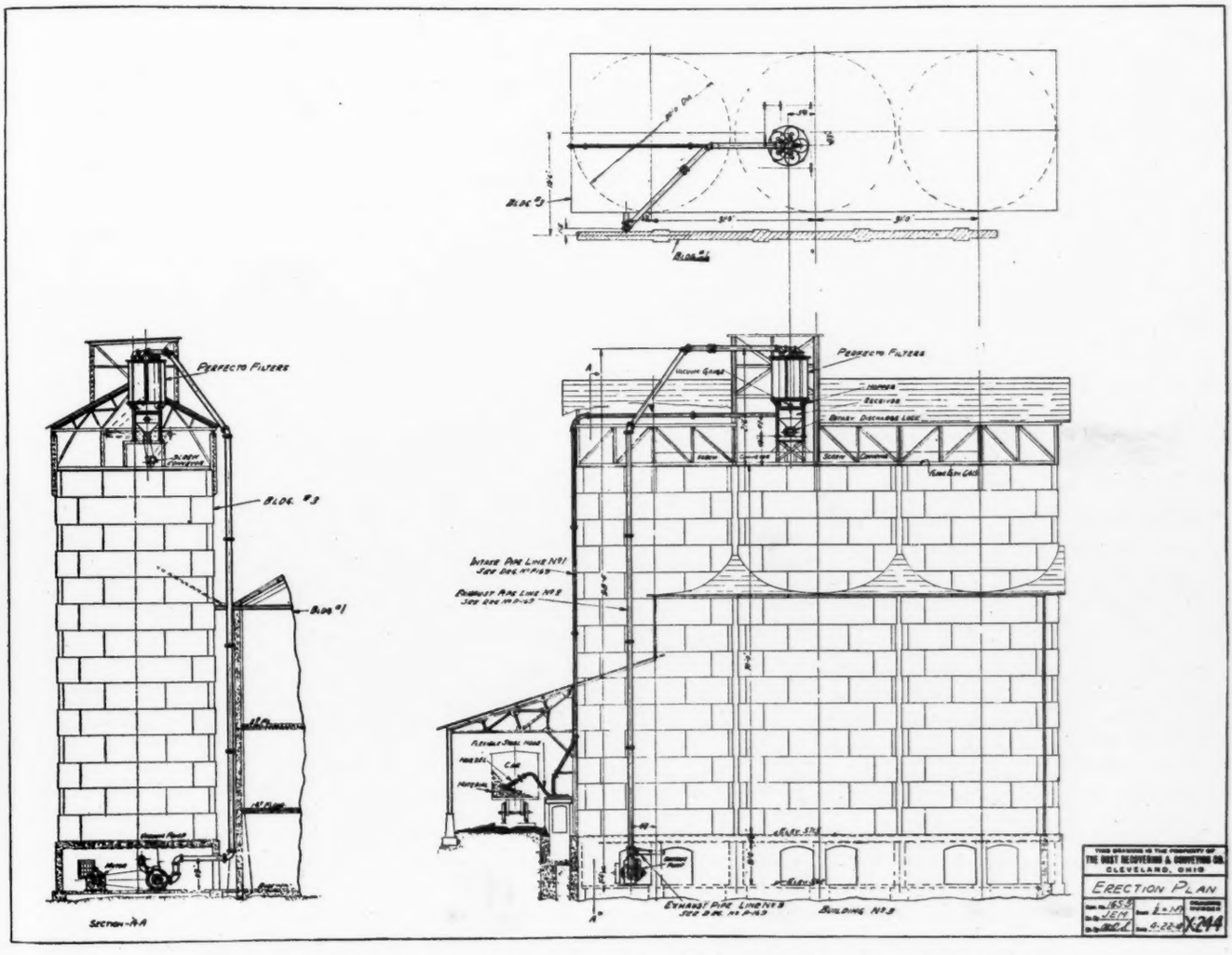
The following sketches showing an actual installation for unloading and handling a finely ground material explains the general features of this system of pneumatic conveying. The other illustrations show the Cleveland factory and laboratory and equipment used in typical installations.

Such an installation consists of a receiving station—filter and hopper—over the bins, steel pipe lines from the receiving station to (1) the suction pump in the basement; (2) a suction nozzle or nozzles at the car end; and suitable valves and hose connections. The hopper traps the material being conveyed and discharges it continuously through an automatic unloading air-lock into the screw conveyor to bins.

From the hopper the air, still containing some of the fine dust, passes into the filter where the dust is filtered out and only clean air is drawn down into the suction pump. A standard motor-driven vacuum pump is the type used, as it does not have to be designed to withstand grit.



Another view of large filter



Typical installation for emptying box cars of pulverized ore into elevated plant bins

General News From the Rock Products Fields

Import Tax on Talc Proposed

WASHINGTON, D. C.—A bill designed to promote the production and manufacture of talc in the United States has just been introduced in the House of Representatives by Congressman Fordney, chairman of the House committee on ways and means, by request of a constituent.

The measure provides an import tax of ½ cent per pound on talc, steatite, soapstone and French chalk, crude and unground; 1 cent per pound on talc, steatite, soapstone and French chalk, ground, washed, powdered or puverized; 2 cents per pound on those commodities when cut or sawed, or in the form of blanks, crayons or cubes, and 50 per cent ad valorem on manufactures of talc, talcum, steatite, soapstone and French chalk, wholly or partly manufactured, if not decorated; if decorated, 60 per cent ad valorem.

Two New Acid Phosphate Factories

THE LICKING AGRICULTURAL CHEMICAL CO. has been established with office and plant at Newark, Ohio, and has been incorporated with a capital of $150,000. The incorporators, who will serve as a board of directors, are Townsend C. Jury, president; J. Henry Miller, vice-president; Orville Kieger, treasurer; D. B. Grubb, secretary; F. T. Mercer, J. S. Graham, John McNamara, Louis Edman and B. F. McDonald.

The buildings of the Artificial Stone and Plaster Co. have been purchased and will be remodeled for the manufacture of acid phosphate, with a capacity of 80 tons per day. The new company expects to be in the market for the spring trade.

New Plant in Savannah

Savannah is to have a new fertilizer concern, the Atlantic Fertilizer and Phosphate Co., which has applied for incorporation, with principal office and warehouse in the City of Savannah. The company will manufacture and sell all grades of mixed fertilizers, acid phosphate, nitrate of soda and potash salts. The plant will be of such proportions as to add materially to the importance of Savannah as a fertilizer plant center. The capital stock is $50,000 paid in.

The president of the new company is Deppish Kirkland, a well-known business man of Savannah. The vice-president and general manager is Fred C. Debele. Mr. Debele has been an active business man in Savannah for many years. After serving as assistant manager of the Standard Oil Co. for the States of North Carolina and South Carolina for two years, he returned to Savannah and became assistant to the president of the Georgia Supply Co., and three years later assistant to the president of the Mutual Fertilizer Co., which place he held for eight years. Last year he was made assistant sales manager of the Southern Fertilizer & Chemical Co. He has traveled extensively over the large territory of the concerns with which he has been connected.

The superintendent of the new plant is Norman Pike. He is an experienced manufacturer, for twenty-odd years superintendent of large fertilizer plants of leading manufacturers.

Share Your Experience

DURING THE NEXT YEAR or two of readjustment involving sudden and radical changes, a knowledge of facts will be vital. Figures on production, sales, prices, and demand conditions should be exchanged and basic facts prevailing in the industry summarized for the benefit of the business man. The inevitable effects of such a system is to tend to create more stability in price and more normal conditions generally in the industry. It eliminates the disastrous competition arising from distrust or guesswork and supplants it with straight business competition based on facts. It creates the status of competition the law is designed to protect and removes in large measure the danger of monopoly. Unfortunately the business man who makes a fetish of so-called business secrets, fails to appreciate the advantages following from such a policy and by his refusal to cooperate creates the conditions he is first to denounce.—Franklin D. Jones.

U. S. May Import German Potash

WASHINGTON—German potash may be imported into the United States under a ruling by the war trade board, according to the Pittsburgh Post. The commodity, the board announced, has been removed from the limited list of materials on which war-time restrictions were retained when the general blockade was lifted July 14.

Safety in Quarries and Crushing Plants

THE EIGHTH ANNUAL SAFETY CONGRESS, under the auspices of the National Safety Council, will be held in Cleveland, O., October 1 to 4, at the Statler Hotel.

Besides a wealth of papers and discussions on safety work and accident prevention in general there will be, as usual, a special session on cement, under the chairmanship of H. G. Jacobson, manager of the Accident Prevention and Insurance Bureau of the Portland Cement Association. Mr. Jacobson, through ROCK PRODUCTS, extends a hearty invitation to all lime-plant, quarry and crushing-plant operators to attend this session.

The program, Thursday, October 2, includes:

9:30 a. m.

I. Physical Examination, First Aid, and Care of the Injured at Cement Plants

Dr. Charles E. Coleman, Plant Physician, Marquette Cement Manufacturing Company and Lehigh Portland Cement Company, Oglesby, Ill.

Discussion

10:15 a. m.

II. Sanitation in Cement Plants

B. L. McKay, Safety and Employment Manager, Universal Portland Cement Company, Buffington, Ind.

Discussion

11:00 a. m.

III. Educating Cement Plant Employees in Safety

J. C. Jesse, Superintendent, Continental Portland Cement Company, St. Louis, Mo.

Discussion

11:30 a. m.

IV. General Discussion, Questions and Answers

On Friday, October 3, the program will be:

9:30 a. m.

I. Hazards in Cement Stock-houses, Packing and Shipping Departments

Russell Frame, Secretary, Central Safety Committee, Alpha Portland Cement Company, Easton, Pa.

Discussion

10:15 a. m.

II. Blasting in Quarries

Dr. Walter O. Snelling, Director of Research, Pennsylvania Trojan Powder Company, Allentown, Pa.

Discussion

11:00 a. m.

III. Platforms, Walk-ways, Stairs, Ladders, and Floors in Cement Mills

E. R. Abbott, Safety Engineer, Canada Cement Co., Ltd., Montreal.

Discussion

11:30 a. m.

IV. General Discussion, Questions and Answers

General News From the Rock Products Markets

National Exposition of Chemical Industries

DURING THE WEEK of September 22 there will be held in Chicago the Fifth National Exposition of Chemical Industries. A great many rock products producers will be interested in this exposition, for they produce the raw materials used in a host of chemical industries.

Lime manufacture is fast becoming considered a chemical industry in itself, and lime men who have an opportunity to visit the exhibition will doubtless be well repaid in the acquaintance they will make with some of the uses made of lime. Moving pictures will be shown of lime manufacture.

The exposition will be held in the Coliseum and the First Regiment Armory. There will be many exhibits of interest to other rock products producers.

More Influences at Work to Standardize Construction Materials

THAT IT IS high time for the producers of building materials, such as sand, gravel, crushed stone, lime, etc., to agree upon certain standards is evident from many angles. The most recent interest in the subject is being shown by the National Federation of Construction Industries, which proposes to go in for standardization of building codes, specifications, inspection, etc., but more particularly standardization of building materials.

The weekly bulletin of the association states:

If it were possible for manufacturers of construction materials to standardize their product into a minimum number of varieties compatible with successful building operations, the manufacture of such material could be placed upon a bulk basis which in many cases is now impossible. Quantity manufacture has made the United States supreme as an industrial nation. The construction industry, however, is in many particulars so unstandardized that quantity production is now impossible.

The Executive Committee has authorized the creation of a Committee on Standardization, which will be formed as rapidly as possible. It is intended so to organize this committee as, if possible, to reach into all phases of construction interests, since it will be practically impossible to effect standardization without the co-operation and assistance of all of the interests concerned. The work of this committee will undoubtedly extend over a number of years, and the results which are possible of achievement are at the present time almost beyond estimate.

The attempt to standardize the construction industry in all of its ramifications is a most patent function of the National Federation of Construction Industries, and is an excellent illustration of the type of work which should be undertaken by it. The directors feel that the Federation, composed as it is of associations and individuals concerned with a wide variety of construction interests, should logically undertake to coordinate the effort of these interests upon the problem of rendering construction activities more efficient through standardization of materials, methods and legislation.

Americanization Through Industrial Employment

By William Lamkie
Industrial Relations Service, New York City

AN AMERICAN STANDARD of living can not be maintained among foreign-born workers until a minimum wage based on the requirements of modern civilization be established. We must have health and employment insurance, old-age pensions, child-labor laws, and the regulation of employment to safeguard the future motherhood and protect the rights of these mothers. Up to the present we have approached the foreign born through his physical forces and we have neglected to appraise and utilize his spiritual faculties. After all, the employes of an establishment are its best customers and only by stimulating the desires of the foreign-born workman for the better things of life, through advertising and other means, will industry find a market for its greatest production.

To make the employment service an Americanizing force there must be a better means for distributing the alien workers who usually settle in the congested centers of ports of entry. There must be labor exchanges performing for labor the service the Federal reserve banks render the money market. The vestibule-school idea developed during the war offers one of the greatest incentives for the Americanization of the foreign-born worker as it enables him to break into the class of skilled labor. The foreign-born worker who becomes Americanized should receive a higher wage than one who has not, and the wage scale should be granted to cover each step in the process of citizenship.

English and citizenship can best be taught the foreign-born workman by his fellow workmen, the study following the routine of the day's work and pay.

New Silica Brick Plant in District of Columbia

WASHINGTON, D. C.—One of the most important deals "put over" in this section for some time was consummated during August, when James E. Granbery purchased the Silicate Brick Co.'s property, plant and good will from British interests.

This plant is located at Terra Cotta, a suburb of Washington, on the main line of the Baltimore & Ohio, to which it has a spur track. The purchase price, together with the immediate improvements necessary to complete the equipment, is understood to be about $150,000.

Extensive improvements are contemplated at the plant. New machinery has already been ordered, which will double the present capacity of the plant, furnishing an output of between 80,000 and 90,000 bricks daily, the installation of which will involve an expenditure of about $75,000.

John G. Benton, former managing director of the plant, will remain associated with the new owner.

Sues Coal Company for Loss of River Sand Bar

LOUISVILLE, Ky.—An interesting suit was filed in Louisville during the week of August 25 by the E. T. Slider Co., sand and gravel producer. This company has brought suit against the Pittsburgh Coal Co. and Monongahela Coal & Coke Co., allied concerns, which have controlled the river coal business for many years. The suit is for $260,000, and represents a loss of 10c. a cubic yard in transportation charges forced on the sand company in handling more than 2,000,000 cu. yd. of sand and gravel since 1914, when it was forced to go 13 miles up the Ohio River in search of a new sand bar.

In that year the coal companies purchased mooring privileges at the foot of Fulton St. in the Louisville harbor. The company then dredged out the channel, and in so doing caused the mud and slime to overflow the Slider company's workings on the sand bar, which was its property. This ruined the bar, and made it impossible to take out and sell the sand. The 13-mile haul added 10c. to its cost of handling each yard of sand on transportation charges, and the company is endeavoring to recover. There are many angles involved in a case of this sort, especially river cases, and the decision should prove interesting. A decision in favor of the sand and gravel producer would have a far-reaching effect.

The Rock Products Market

Wholesale Prices of Crushed Stone

Prices given are per ton. F. O. B., at producing plant or nearest shipping point

Crushed Limestone

City or shipping point	Screenings, ¼ inch down	½ inch and less	¾ inch and less	1½ inch and less	2½ inch and less	3 inch and larger
EASTERN:						
Akron, N. Y.	.60	.60	1.00	1.00	1.00	1.00‖
Auburn and Syracuse, N. Y.	.80	1.20	1.20	1.20	1.20	1.20
			Railroad ballast, 1.00			
Buffalo, N. Y.			1.00@1.10 per ton, all sizes			
Burlington, Vt.	1.25		3.00	1.75@2.00	1.75	
Chaumont, N. Y.		1.75	1.65	1.35	1.25	1.25
Coldwater, N. Y.			Flux, 1.50@2.10			
Grove, Md.	.75	1.85	1.65	1.50	1.25	1.10
North LeRoy, N. Y.	1.00	1.00	.75	1.00	1.00	1.00‖
Walford, Pa.	1.25	1.40	1.50	1.50	1.50	1.50
CENTRAL:						
Alden, Ia.	.40		1.00	1.00	1.00	
Alton, Ill.	1.80		1.40	1.35		
Anna, Ill.			1.00@1.25 for prepared sizes			
Belvidere, Ill.			1.00 for any size produced			
Brillion and Sherwood, Wis.	.90@1.00		1.00	1.00		1.00
Buffalo, Ia.	.70	1.10	1.05	1.00	1.00	
Davenport, Ia.	1.50*	1.50*	1.50*	1.50*		
Dundas, Ont.	.65	1.05	1.05	1.05	.85	.85
Eden and Knowles, Wis.	.80@1.00	.80	1.00	1.00	1.00	1.00
Elmhurst, Ill.	.85	1.00	1.00	.85	.85	.85
Greencastle, Ind.	1.00@1.25	1.10	1.00	.90	.90	.90
Illinois, Southern	1.50	1.25	1.25	1.25	1.10	
Kokomo, Ind.			.90@1.00 all sizes			
Lannon, Wis.			1.00 all sizes			
Lima, Ohio	1.10	1.25	1.10	1.10	1.10	1.10
Mankato, Minn.				(1-in. 1.50)	(2-in. 1.25)	
Mayville, Wis.	.75	.75@ .90	1.00	1.00	1.00	1.00
McCook, Ill.	.90@1.10	1.50	.80@1.00	.70@ .85	.70@ .80	.70@ .80
Montrose, Ia.		1.05@1.10	1.05@1.15	1.00@1.10	1.00	
Ottawa, Ont.	2.50	2.75		2.25	2.00	
River Rouge, Mich.	.80@ .85	1.15	1.15	1.15	1.15	1.15
Sheboygan, Wis.			1.00@1.10 for all sizes			
Stone City, Ia.	.50		(1-in. 1.40)	1.30	1.20	
Toronto, Can.	1.55	1.95	1.95	1.95	1.75	1.75
			These prices include 90c freight			
SOUTHERN:						
Brooksville, Fla.	1.00			2.50		
Cartersville, Ga.		1.60	1.60	1.50	1.50	
Fort Springs, W. Va.	1.00	1.20	1.40	1.60	1.40	
Irvington, Ky.			1.00	1.00	1.00	1.00
Mascot, Tenn.		1.00@1.25				
Memphis Junction, Ky.			Average 1.10			
Winnfield, La.	1.00	1.60	1.60	1.60	1.60	1.75
WESTERN:						
Atchison, Kans.	.50	1.80	1.80	1.80	1.70	1.70
			Rip-Rap, 1.30			
Blue Springs and Wymore, Neb.	.15	1.55	1.55	1.45@1.50	1.35@1.40	1.30
El Paso, Tex.			1.00 for all sizes			
Kansas City, Mo.	.60	1.40				
New Braunfels, Tex.	.60	1.25@1.50	1.00@1.30	1.00@1.25	.90@1.10	

Crushed Trap Rock

City or shipping point	Screenings, ¼ inch down	½ inch and less	¾ inch and less	1½ inch and less	2½ inch and less	3 inch and larger
Birdsboro, Pa.	1.25	1.80	1.70	1.60	1.50	1.25
Branford, Conn.	.80	1.50	1.50	1.20	1.10	
Castro Pt., Richmond, Cal.	.50*		1.50*	1.40*	1.40*	
Duluth, Minn.	.50@.65	1.50	1.35	1.15	1.15	1.00
Farmington, Conn.		1.05	1.05	1.05	.95	
Glen Mills, Pa.	1.00	1.35	1.70	1.55	1.35	1.40‖
Little Rock, Ark.	1.75	2.50		2.00	1.50	1.35
Millington, N. J.	1.80	1.80	1.80	1.60	1.40	
New Britain, Conn.	.75	1.20	1.15	1.10	1.00	
Oakland, Calif.		1.75*	1.75*	1.75*	1.75*	
Rock Hill, Pa.	1.00	1.35	1.70	1.55	1.35	1.35‖
Winchester, Mass.	.75	.75	1.60	1.45	1.25	1.25‖

Miscellaneous Crushed Stone

City or shipping point	Screenings, ¼ inch down	½ inch and less	¾ inch and less	1½ inch and less	2½ inch and less	3 inch and larger
Atlanta, Ga.—Granite	1.60		2.85	2.35	2.35	
Fair Oaks, Calif.—Cr. Bldrs.	.85	1.05	.95	.85	.85	
Hendlers, Pa.—Quartzite	.80	1.00	1.25	1.00	1.00	1.00‖
Little Falls, N. Y.—Syenite	.80	1.20	1.40	1.20	1.20	1.20‖
Middlebrook, Mo.—Granite	3.50		1.75	1.75		1.00‡
Roseburg, Ore.		1.50	1.25	1.05	1.00	1.00
Smith Siding, Richmond, Va.—Granite	1.25		1.50	1.50	1.50	
Stockbridge, Ga.—Granite	.50	2.00	1.90	1.75	1.75	
White Haven, Pa.—Sandstone	.85	1.20	1.40	1.20	1.20	1.20‖

*Cubic yard. †Agrl. lime. ‖R. R. ballast. §Flux. ‡Rip-rap. a 3-inch and less.

Agricultural Limestone Wholesale at Plant, per Ton

EASTERN:

Coldwater, near Rochester, N. Y.—Analysis: $CaCo_3$, 56.77%; $MgCo_3$, 41.74%—80% thru 100 mesh; ppr., 4.50; bulk 3.00

Chaumont, N. Y.—Analysis: $CaCo_3$, 92 to 98%; $MgCo_3$, 1.51%—(Thru 100 mesh); ppr., 4.00; bulk 2.50
Paper bags 4.00

Cobleskill, N. Y.—Ppr., 5.00; bulk 3.00

Grove City, Pa.—Analysis: $CaCo_3$, 94.75%; $MgCo_3$, 1.20%—(70% thru 100 mesh); 80 lb. ppr., 4.60; bulk 3.25

Grove, Md.—90% thru 4 mesh; bulk 3.00

Hillsville, Pa.—Analysis, $CaCo_3$, 85%; $MgCo_3$, 1½%—(70% thru 100 mesh) in 80 lb. ppr. bags, 4.25; bulk 2.75

Jamesville, N. Y.—68% thru 100 mesh; 95% thru 50; 100% thru 20. Sacks, 3.75; bulk 2.25

Lime Kiln, Md.—50% thru 50 mesh; bulk 4.00

Pownal, Vt.—(50% thru 100) Analysis, $CaCo_3$, 90%; $MgCo_3$, 5%; ppr., $4.50; bulk 2.75

Walford, Pa.—(70% thru 100 mesh; 85% thru 50; 50% thru 50; 100% thru 4); sacked, 4.25; bulk 2.75

West Stockbridge, Mass.—Analysis: Combined carbonate, 95%—33% thru 200 mesh; 66% thru 100; 100% thru 40. Bulk 2.85

CENTRAL:

Alton, Ill.—Analysis: $CaCo_3$, 96%; $MgCo_3$, 0.75%—90% thru 100 mesh.. 3.00
50% thru 50 mesh 2.00

Anna, Ill.—Ground; bulk 1.25

Bedford, Ind.—(90% thru 10 mesh) Analysis, $CaCo_3$, 98.5%; $MgCo_3$, 0.5% 1.75

Belleville, Ont.—50% thru 100 mesh 2.50

Canton, O.—100% thru 10 mesh; 49% thru 100; 59% thru 50 ..... 3.00
80 lb. bags 4.80

Chicago, Ill.—Analysis, $CaCo_3$, 53.63%; $MgCo_3$, 37.51%—90% thru 50 mesh 1.00

Columbia, Ill., near East St. Louis—(⅛" down) ..... 1.25@1.80

Ellettsville, Ind.—Analysis, Carbonate, 98% 2.00

Elmhurst, Ill.—(Analysis, $CaCo_3$, 35.73%; $MgCo_3$, 20.69%) 50% thru 50 mesh 1.25

Greencastle, Ind.—(Analysis, $CaCo_3$, 98%) 50% thru 50 mesh 1.75

Howenstein, O.—100% thru 10 mesh; 59% thru 50; 39% thru 100 ..... 2.75@3.00

Lannon, Wis.—(90% thru 50 mesh) Analysis, 54%, $CaCo_3$; 44%, $MgCo_3$ 2.00

Marble Cliff, O.—(50% thru 100 mesh) Analysis, $CaCo_3$, 86%; $MgCo_3$, 8%.. 2.50

Marblehead, O.—(Analysis: $CaCo_3$, 95.33%) 50% thru 100 mesh ..... 3.00@4.50

McCook, Ill.—Analysis, $CaCo_3$, 54.10%; $MgCo_3$, 45.04%—100% thru ¼" sieve; 78.12% thru No. 10; 53.29% thru No. 20; 38.14% thru No. 30; 26.04% thru No. 50; 16.27% thru 100 ..... .90@1.00

Milltown, Ind.—Analysis, $CaCo_3$, 94%; $MgCo_3$, 3% 1.50

Monon, Ind. 1.25

Montrose, Ia.—(90% thru 100 mesh).. 1.25

Muskegon, Mich.—(90% thru 50 mesh) Analysis, $CaCo_3$, 53.35%; $MgCo_3$, 43.27% 2.50

Piqua, O.—Analysis: $CaCo_3$, 82.8%; $MgCo_3$, 8.2%; neutralizing power in terms of calcium carbonate, 95.3%—70% thru 100 mesh, bulk ..... 2.50@4.00

Rockford, Ill.—Analysis, $CaCo_3$, 53.75%; $MgCo_3$, 44.35% 1.25

(Continued on next page.)

Agricultural Limestone Wholesale at Plant, per Ton

(Continued from preceding page.)

St. Paul, Ind.—Analysis, $CaCo_3$, 85%; $MgCo_3$, 12% 1.50

Stolle, Ill. (near East St. Louis on I. C. R. R.)—(Thru ⅛" mesh) Analysis, $CaCo_3$, 89.61 to 89.91%; $MgCo_3$, 3.82% 1.50

Stone City, Ia.—(90% thru 50 mesh) Analysis, $CaCo_3$, 98% ..... .50

Toledo, O.—Analysis, $CaCo_3$, 52.72%; $MgCo_3$, 43%—(20% thru 100 mesh; 30% thru 50; 80% thru 100; 100% thru 5/32 screen) 1.80

Whitehill, Ill. — Analysis, $CaCo_3$, 96.12%; $MgCo_3$, 2.50%—
50% thru 50 mesh, bulk 1.50
90% thru 100 mesh 5.00

SOUTHERN:

Dittlinger, Tex. — Analysis, $CaCo_3$, 99.09%; $MgCo_3$, .04%.
90% thru 100 mesh 2.00
90% thru 4 mesh 1.00

Grovania, Ga.—Analysis, $CaCo_3$, 95%; $MgCo_3$, none—50% thru 100 mesh 2.50

Hopkinsville, Ky.—Analysis, 94.6 to 98.1% $CaCo_3$—Bulk 2.00

Irvington, Ky.—(90% thru 50 mesh) .. 2.00

Memphis Jct., Ky.—(Analysis, $CaCo_3$, 95.31%; $MgCo_3$, 1.12%) average price 2.00

Ladds, Ga. — Analysis: 96 to 98% combined carbonates—All thru 10 mesh with all dust in 2.50

Mascot, Tenn.—Analysis, $CaCo_3$, 52%; $MgCo_3$, 38%.
(80% thru 100 mesh) 2.50
(All thru 10 mesh) 2.00
Paper bags $1.50 extra per ton; burlap, 2.00 extra per ton.

Maxwell, Va. 2.50

Tyrone, Ky.—Analysis, $CaCo_3$, 93%; $MgCo_3$, 6%—90% thru 4 mesh 2.25

Winnfield, La.—(90% thru 50 mesh) 3.00

WESTERN:

Fresno, Calif.—(Analysis, $CaCo_3$, 94%; $MgCo_3$, .02%) 50% thru 200 mesh; 90% thru 100; 100% thru 40. Prices for delivery: Sacks, 6.50; bulk Sacks, 10c each. 6.00

Kansas City, Mo., Corrigan Sid'g—
50% thru 50 mesh; bulk 1.35

Miscellaneous Sands per Ton at Plant

Silica sand is quoted washed, dried and screened, unless otherwise stated.

GLASS SAND:

Berkeley Springs, W. Va. ..... 2.00@2.10
Special hand selected rock 2.50

Cedarville and South Vineland, N. J.—
Glass, damp 2.00
Glass, dry 2.50

Gray Summit, Mo. ..... 2.00@2.50

Guion, Ark—Glass on contracts 1.50

Hancock, Md.—Engine and glass ..... 2.50@3.00

Klondike and Pacific, Mo.:
Contracts 2.00
Car lots 2.50

Mapleton, Pa. 2.50
Glass, damp ..... 2.00@2.25

Massillon, Ohio 3.00

Michigan City, Ind. ..... .30@ .40

Millington, Ill. 1.75

Mineral Ridge, O. 2.75

Montoursville, Pa.—Green, washed ..... 2.00@2.75

Ottawa, Ill. 2.00
Large contracts 1.75

Robinson, Md., washed, screened, not dried 2.00

Sands, Elk Co., Pa.—Selected, green .. 2.50

Thayer, W. Va.—Washed 2.25
Not washed 2.00

FOUNDRY SAND:

Albany, N. Y.—Core 1.50
Molding fine 2.00
Molding coarse 1.80
Brass molding 2.00
Sand blast 3.75

Allentown, Pa.—Core ..... 1.25@1.50

Arenzville, Ill.—Molding fine 1.50

Berkeley Springs, W. Va.—Roofing 2.00

Bowmanstown, Pa.—Core 1.25
Molding fine or coarse 1.50
Roofing pebble 3.00

(Continued on next page)

Wholesale Prices of Sand and Gravel

Prices given are per ton, F. O. B., at producing plant or nearest shipping point

Washed Sand and Gravel

City or shipping point	Fine Sand, 1/10 inch down	Sand, ¼ inch and less	Gravel, ½ inch and less	Gravel, 1 inch and less	Gravel, 1½ inch and less	Gravel, 2 inch and less
EASTERN:						
Attica, N. Y.	.60	.60	.60	.75	.75	.75
Boston, Mass. (On Docks)	1.25	1.00	1.75	1.70	1.60	1.60
Buffalo, N. Y. (Niagara River)	.80	.80	.75	.75	.75	.75
Farmingdale, N. J.		.43	1.25	1.15	1.05	
Morristown, N. J.	.60	.60	1.20	1.00	1.00	
Philadelphia, Pa.		.95		1.40	1.25	
Pittsburgh, Pa.		.90@1.00	1.10	.90@1.00	.70@ .80	.70@ .80
Washington, D. C.—Wharves	.75	.75	2.00	1.40	1.20	1.20
West Peabody, Mass.	.35@ .45	.35@ .45	2.00	1.20	1.20	1.20
CENTRAL:						
Anson, Chippewa Co., Wis.	.50	.50	1.00	.25@1.00	.85	.85
Attica, Covington, Silverwood, Ind., Palestine, Ill.	.75	.75	.75	.75	.75	.75
Barton, Wis.	.75	.70	1.00	.70	.70	.70
Chicago		1.25@1.50	1.10@1.25	1.10@1.25	1.10@1.25	1.10@1.25
Cincinnati & Miami Grove, O.	.60@ .80	.55@ .75		.55@ .75	.55@ .75	
Columbus, O.	1.00	.65@1.00	.60@1.00	.70@1.00	.70@1.00	.65@1.00
Des Moines, Ia.	50@1.00	.50	1.50	1.50	1.25	1.25
Earlestead, near Flint, Mich.	.55@ .60	.55@ .60		.85@ .90	.75@ .80	.75@ .80
Escanaba, Mich.		.90	1.60	1.20	1.00	.90
Fort Dodge, Ia.	1.10	1.00	1.80	1.80	1.80	1.80
Fort Jefferson and Mechanicsburg, O.	.50	.50	.50	.70	.60	.60
Grand Rapids, Mich.		.65*		1.15*	1.00*	1.00*
Illinois, Northern	.50@ .60	.60@ .70	.75	.60@ .75	.60@ .75	.60@ .70
Indianapolis, Ind.		.60			.75	
Janesville, Wis.		.50			.60@ .70	
Mason City, Ia.	.70	.60	1.55	1.50	1.40	1.35
Milwaukee, Wis.			1.20 for all sizes			
Moline, Ill.	.60	.60@ .80	1.00@1.20	1.00@1.10	1.00	1.00
Montezuma, Covington, Ind.	.75	.75	.85	.75	.75	.75
Oxford, Mich.		.55	.90	.90	.80	.80
Rockford, Ill.		.60			.60	
Saginaw, Mich. (Includ'g frt.)	.95	.95	1.60	1.60	1.60	1.45
St. Louis, Mo.	(Mississippi sand, 1.90; Meramec river sand, 1.95)					
St. Louis, Mo., F. O. B. cars	1.35	1.20	1.50	1.30		1.25
Summit Grove, Ind.	.75	.75		.75	.75	
Terre Haute, Ind.	.75	.75	.85	.75	.75	.75
Waupaca, Wis.		.35				.70
Winona, Minn.		.70	1.60	1.10	1.10	1.10
SOUTHERN:						
Knoxville, Tenn.	.85	.85		1.50	1.50	1.10
Lake Weir, Fla.	.50					
Macon, Ga.		.50@ .60				
Memphis, Tenn.	.80	.80			1.00	
New Martinsville, W. Va.	1.30	1.00@1.10		1.20		.70@ .80
Pelzer, S. C.	.65					
Roseland, La., and Condron, Miss.		.40		1.00		
Thomas, La.	.60					1.75
Waco, Texas	.70@ .80	.70@ .75	1.10			1.10
WESTERN:						
Kansas City, Mo.	.60	.60	(Kaw river sand retail 1.50 per cu. yd.)			
Lincoln, Neb. (on cars)	1.00	1.00	2.10	2.10		1.90
Niles, Calif.		.50@ .75	.50@ .75	.50@ .75	.50@ .75	.50@ .75
Pueblo, Col.	.80*	.60*			1.50*	
Roseburg, Ore.	1.50	1.00	1.25	1.00	1.00	1.00
Saratoga, San Jose, Calif.		.60@ .75	.60@ .70	.60@ .70	.60@ .70	.60@ .70
San Francisco, Calif.	1.00@1.25	1.15	1.20	1.20	1.20	1.20
Seattle, Wash.	1.25*	1.25*	2.00*	1.25*	1.25*	1.25*

Bank Run Sand and Gravel

City or shipping point	Fine Sand, 1/10 inch down	Sand, ¼ inch and less	Gravel, ½ inch and less	Gravel, 1 inch and less	Gravel, 1½ inch and less	Gravel, 2 inch and less
EASTERN:						
Burnside, Conn.	.80*					
Lowell Junction, Mass.	.75*	.65*@.75*	.60*			
Pittsford, N. Y.		.50@ .55			.50@ .60	
Yardville, N. J.		.50@ .75				
York, Pa.		1.00@1.10	(crushed rock sand)			
CENTRAL:						
Attica, Covington, Silverwood, Ind., Palestine, Ill.	.60	.60	.60	.60	.60	.60
Beloit, Wis.		.60			.60	
Des Moines, Ia.	Washed concrete mix., 25% gravel, .70; 50% gravel, .90					
Escanaba, Mich.	1.00 cu. yd., all sizes					
Grand Rapids, Mich.				.75*		
Gr'd Rapids, Muskegon, Mich.		.30				.40@ .50
Hersey, Mich.	.50			.50	.50	.50
Illinois, Northern						.50@ .60
Indianapolis, Ind.	Washed concrete, mix, .65					
Janesville, Wis.					.55	
Montezuma, Terre Haute, Ind.					.60	.60
Oxford, Mich.					.85	
Rockford, Ill.	Sand and Gravel mixed, .55@.65					
Saginaw, Mich. (Incldg. frt.)	1.05	1.05	1.20	1.20	1.20	1.20
Summit Grove, Ind.	.50 for all sizes					
Wabash Valley District, Ind.	.60 for all sizes					
Waupaca, Wis.						.40
Winona, Minn.	Pit run gravel under 2-in., .70					
SOUTHERN:						
Albany, Ga.	.70@1.00					
Dudley, Ky. (Crushed Sand)		.95		1.00		
Lindsay, Texas	1.25				.50	
Thomas, La.						.65@ .85
Waco, Texas						.67
WESTERN:						
Pueblo, Colo.	.60*	River Run, .60 unscreened				
San Francisco, Calif.	.25 on cars at plant					
Saratoga, Jan Jose, Calif.		.60@ .75	.60@ .70	.60@ .70	.60@ .70	.60@ .70

* Cubic yard. B Bank. L Lake. || Ballast.

Crushed Slag Wholesale at Plant Per Ton

City or shipping point	Roofing	Screenings, ¼ inch down	½ inch and less	¾ inch and less	1½ inch and less	2½ inch and less	3 inch and larger
EASTERN:							
Bethlehem and Emaus, Pa.	2.50	.85	1.50	.85	.85	.85	.85
Buffalo	2.00	.85	.85	.85	.85	.85	.85
E. Canaan, Conn.	4.00	1.00	1.50	1.15	1.00	1.00	1.00
Erie, Pa.	1.75	.85@1.00	1.00@1.50		1.00	1.00	1.00
Emporium, Pa.		1.00	1.00		1.00	1.00	1.00
Ensley, Ala.	2.05	.90		.90@1.20	1.00	.90	.85
Hokendaugua and Topton, Pa.	2.50	.85	1.50	.85	.85	.85	.85
Lebanon (Donaghmore), Pa.	2.50	.85	1.50	.85	.85	.85	.85
Philadelphia Dist.	2.50	.75	1.50	.85	.85	.85	.85
Pittsburgh, Pa. (East)	2.05	1.10	1.50	1.10	1.10	1.10	1.10
Pittsburgh, Pa. (West)	2.25	.75	1.50	.85	.85	.85	.85
Sharpsville, Pa.	1.75	1.00	1.25	1.00	1.00	1.00	1.00
CENTRAL:							
Chicago, Ill.	All sizes, $1.50, F. O. B. Chicago						
Detroit, Mich.	All sizes, 1.65, F. O. B. Detroit						
Ironton and Jackson, O.	2.00	1.25	1.50	1.25	1.25	1.25	1.25
Toledo, O.	All sizes, 2.00, F. O. B. Toledo						
Youngstown, Dover, Hubbard, Leetonia	2.00	1.10	1.50	1.10	1.10	1.10	1.10

Agricultural Lime and Hydrate at Plant Per Ton

	Agricultural Lime—Bulk	Agricultural Lime—Bags	Per Cent CaO	Per Cent MgO	Agricultural Hydrate Bags
EASTERN:					
Berkeley, R. I.		16.00	45	15	
Bellefonte, Pa.	7.25		95.5	.72 to .89	
Bridgeport, Pa.	7.50		55	44	10.25
Cavendish, Vt.	2.50 bbl. in car lots				
Cavetown, Md.	8.50				
Cedar Hollow, Devault, Rambo and Swedeland, Pa.	8.00	10.75 grd.	58	38	10.75
Chippewa, Lycoming Co., Pa.	5.00@5.50		78.67	1.33	
Espy, Pa.	4.50		82	1.25	
Farnams, Mass.	5.00	7.50			
Frederick, Md.	8.00				10.50
Grove City, Pa.	7.00 Imp.	9.00 grd.	75.48	0.80	10.00
Grove, Md.	8.00				10.75
Highgate Springs, Vt.		8.00	85	2	
Hollidaysburg, Pa.	6.50		94.25	.30	
Hyndman, Pa.	5.00	8.50	80.23	2.97	
Lime Bluff, Pa.	5.00@6.25		78.67	1.33	
Lime Ridge, Pa.	5.00@6.25		80.56 to 82.56	3.87 to 1.75	
Mt. Union, Pa.	4.13		96.6		
Munns and Blakeslee, N. Y.	3.00	4.50	53.0		
Newburgh, N. Y.			57	38	8.00
New Castle, Pa.	3.50	4.50	47.6 to 50.4	0.62 to 1.12	
Ottawa, Ont.	12.00		95	1.5	
Paxtang, Pa.	5.00		60	12	
Rasindale, N. Y.	8.00		96	5	
Steuben, Pa., Dover Plains, N. Y., York, Pa.		7.00@9.50	70		10.75 to 12.00
Union Bridge, Md.	8.50		73	1	10.75
West Rutland, Vt.	5.00	7.50	68	3	10.00
Williamsport, Pa.	5.00@5.50		80 to 90	2 to 3	
Williams Station, Pa.	7.50		60.6	39.1	9.75@10.50
Zylontte Station, Adams, Mass.		8.00			
CENTRAL:					
Alton, Ill.	9.50				
Canton, O.		9.00			9.00
Delaware, O.			50	5 to 12	8.50
Forest, O.	7.50				
Manistique, Mich.		10.00	54 & 95	40 & 1.75	10.00
Marblehead, O.	2.25	3.75			8.75
Mitchell, Ind.	9.00				11.00
Springfield, O.			33.62	17.73	9.00
Woodville, Ohio			46 to 48	30 to 34	8.00
SOUTHERN:					
Burns, Tenn.	8.00		95.6	0.54	11.00
Chippewa, Fla.	5.00		80.0	15.0	
Erin, Tenn.	8.00		99		
Hopkinsville, Ky.	3.00	6.50	98.75		
Hot Springs, N. C.	2.70	4.20			
Knoxville, Tenn.	2.00		57	3	
Lineton, Va.	8.50		97	1.74	
Louis Brook, Va.	8.00	10.25	90	1	
Lushing, Va.	9.00	11.25	60	15	12.75
Maxwell, Va.	4.50		82	1.75	
Mountville, Va.	4.00	5.50	76.6	22.8	
Newala, Ala.	8.50@9.00		99.33		
Ocala, Fla.	4.00	6.00 pulv.	98½ (dry basis)		
Staunton, Va.	6.50	9.00	93	5.5	
WESTERN:					
Bellins, Wash.					12.00
Colton, Calif.	4.50		95 to 97	1.5 to 3.0	
Kirtland, N. M.	10.00				
Knowles, Wis.	8.00	9.50	55	45	9.50
Lime, Ore.	15.00		91.48	0.58	
Oscas Island, Wash.		5.50			16.50
San Francisco, Calif.					15.00
Tehachapi, Cal.	6.00	8.00	96	2	

Miscellaneous Sands per Ton at Plant

(Continued from preceding page)

Cedarville and So. Vineland, N. J.—	
Core, damp	2.00
Core, dry	2.50
Cleveland, O.—Core	1.25@1.50
Molding fine, molding coarse	1.75@2.25
Brass molding	1.25@2.00
Delaware, N. J.—Molding	1.50@2.00
Dundee, Ohio—Molding, steel	1.75
Eau Claire, Wis.—Core	1.75
Roofing sand	3.00
Brass molding and sand blast	2.25
Fleetwood, Pa.—Furnace lining	2.15
Refractory silica	2.15
Franklin, Pa.—Core, traction and brass molding	2.00
Molding, fine	2.00
Molding, coarse	1.50@1.75
Gray Summit, Klondike and Pacific, Mo.—Molding fine	1.50@2.00
Greenville, Ill.—Molding coarse red	1.60
Hancock, Md.—Core and brass mldg.	1.85
Hellam, Pa.—Core	2.00
Joplin, Mo.—Stone sawing, flint	1.25
Kansas City, Mo.—Missouri River core	.85
Leesburg, Pa.—Core, furnace lining, molding fine and coarse,	2.00
Mapleton, Pa.—Molding, fine and core, damp	2.00@2.50
Molding, fine, dry	3.00
Massillon, O.—Steel molding coarse	2.50
Furnace lining	3.00
Core	2.50
Michigan City, Ind.—Core, bank	.30@ .40
Millington, Ill.—Furnace lining, roofing, stone sawing	1.75
Core	1.50
Mineral Ridge, O.—Core, molding, sand blast, roofing, brass molding, etc., washed, screened (damp)	2.10
Montoursville, Pa.—Core, molding fine, traction, brass molding	1.25@2.00
Ohio—Various points:	
Iron molding, fine	1.50@2.25
Iron molding, coarse	1.75
Brass molding, minimum	2.00
Ottawa, Ill.—Brass molding	2.00
Ottawa, Ill.—Sand blast sand	3.50
Stone sawing	1.75
Core and roofing	1.75
Traction sand	2.00
Furnace lining	1.50
Providence, R. I.—Core	2.00
Molding fine	2.00
Molding coarse	1.80
Brass molding	2.00
Sand blast	3.50@4.00
Sugar Grove, Ohio—Core (dried and screened)	2.00
Traction	2.00
Thayers, Pa.—Core and traction	2.00
Traction	1.75
Roofing, not washed	2.00
Furnace lining	1.25
Warwick, O.—Core	2.25
Furnace lining, green	2.00
Dried and screened	2.25
Molding, fine	2.50
Molding, dried and screened	2.25
Green	1.75@2.00
Wedron, Ill.—Molding	.25@1.00
West Albany, N. Y.—Molding fine	1.75@2.25
Molding coarse	1.25
Brass molding	1.75
Zanesville, O.—Molding fine	1.50
Traction	.75
Molding coarse	1.25
Brass molding	1.75

Ground Gypsum Rock, per Ton, at Plant

Castalia, O.—Raw, to cement mills	3.50
Crushed, not ground	3.00
Land plaster	6.00
Fort Dodge, Ia., bulk	3.50
Garhutt, N. Y.—Land plaster, bags	7.00
Grand Rapids, Mich.—Crushed gypsum	3.00
Ground gypsum rock	7.00
Gypsumville, Man., Can.	3.00
Oakfield, N. Y.	7.00
Sandusky, O.	6.00

Jute sacks, $3.00 extra; paper, $1.00 extra.

Ground Rock Phosphate at Plant, per Ton

Centreville and Gordonsburg, Tenn.—B. P. L., 60% to 70%; ton, 2240 lbs. Ground rock phosphate (90% thru 100 mesh)	6.00@8.00
Lump rock, 72% to 75%, B. P. L.	6.00@8.50
Centreville, Tenn.—B. P. L., 60%	7.00
B. P. L., 70%	7.75@8.00
B. P. L., 78%	8.00
Mt. Pleasant, Tenn—(B. P. L., 70%)	
12%	6.00
13%	7.00
14%	8.00
Mt. Pleasant, Tenn.—B. P. L., 60% to 70%	6.00@8.00
Nichols, Fla.—Pebble, B. P. L., 70%	10.00
Wales, Tenn.—B. P. L., 70%	7.50@8.50
Walls, Tenn.—B. P. L., 70.2%—	
To County Agri. Assns.	7.50
To others	7.75

Florida Soft Phosphate

Jacksonville (Fla.) District (Add 2.50 for sacks)	10.00@12.00
Phoslime, Fla.	14.00@17.50
Benotis, Fla.	9.00@11.00

General News From the Rock Products Markets

Counter Proposition to Proposed Federal Highway Commission Plan

WASHINGTON, D. C.—Appropriations of $400,000,000 are provided for in a bill which has been introduced in Congress by Senator Sheppard of Texas, to be used in carrying out the Federal road-aid act of 1916. This measure was introduced as a result of the receipt of a communication from Henry J. Allen, representing a number of State highway departments.

"Representatives of the State highway departments of the following States: Kansas, Nebraska, Iowa, Missouri, Oklahoma, Arkansas and Texas, met in conference in Kansas City, Mo., on July 30, to discuss highway problems," wrote Mr. Allen. "It developed that the Federal aid allotted to the States for highway construction is insufficient to meet the call of the people.

"We, therefore, urgently request the extension and continuation of Federal aid to the States in the construction of highways as now obtains in the appropriations already made, and believe that further appropriations as the policy of the Government will ultimately give to the entire country a complete system of national highways without further legislation.

"Each State has laid out a complete system of roads connecting all main market centers and adjoining a like system with the adjacent States.

"The immediate call for additional appropriations is due to the fact that many States have already obligated themselves to the several counties for the entire amount of Federal aid allotted to them by the appropriation passed in February, 1919, and have on hand, in some cases, petitions and bond issues for additional roads equal to the amounts already set aside.

"Before July 1, 1920, all of the present Federal appropriation will have been obligated by the several highway departments, and without additional appropriations definitely made the incentive for the people to continue road building is gone.

"In most States bond issues by the several counties have been carried entirely upon the promise of Federal aid, and in the States where highway departments have already been compelled to give public announcement that all the Federal aid is exhausted further bond issues can not be voted, and continued road petitions will be stopped unless further assistance by Congress is assured.

"The appropriations already made by Congress to spur on road building and give employment to many classes of labor have been most enthusiastically met by the people, and often to such an extent that many petitions are now on file with State highway departments which can not be given consideration.

"One of the great incentives in State road building with Federal aid has been the assurance of Federal supervision in construction, and if additional aid is not given many projects can not have this supervision, which is so much desired.

"Feeling that Congress is fully alive to the necessity of substantial road building as one of the great requirements of the time to facilitate transportation for the marketing of crops and to intensify all kinds of rural development, we would most respectfully request that an additional appropriation for Federal aid in highway construction be made immediately, said appropriation to be as follows:

"The sum of $100,000,000 for the fiscal year ending June 30, 1921.

"The sum of $100,000,000 for the fiscal year ending June 30, 1922.

"The sum of $100,000,000 for the fiscal year ending June 30, 1923.

"The sum of $100,000,000 for the fiscal year ending June 30, 1924.

"All sums to be apportioned and extended in accordance with the provisions of the Federal-aid Act approved July 11, 1916, as amended by the Post Office Appropriation bill passed in February, 1919, and that each State be entitled to its full apportionment until one year after the expiration of the last appropriation allotted to that State."

Chicago Building Industry Tie-Up Ended

FIFTEEN MEN, comprising committees from the material dealers, carpenter contractors and carpenters, signed a compromise agreement on September 10, which will bring the seven-weeks' tie-up of Chicago's building industry to an end. All that remains to be done is a formal vote of the carpenters indorsing the settlement made by their officers.

About 120,000 men of all building trades included in the lock-out will resume work Monday morning, September 15. No time will be lost, now that the difficulties are removed and the much-needed construction in Chicago will be continued.

The agreement provides that the carpenters are to resume work at a wage of 92½ cents an hour, until May, 1920, when they will be placed on the same basis then existing for other skilled trades. A number of other trades were granted $1 per hour.

The cases of ninety-two contractors arrested on charges of conspiracy in connection with the lockout was scheduled for the Municipal Court on September 10.

Railroad Administration Answers Protest Against Open-Top Car Discrimination

IN A TELEGRAM received by Ben Stone, business secretary of the Chicago Sand and Gravel Producers Association, W. C. Kendall, director of the Car Service Section of the United States Railroad Administration, says that "the administration has specially refused to curtail non-coal use of open-top cars in the Central West, and he sees no reason why that policy should be abandoned."

In reply, Mr. Stone says that during the past week, conversation with transportation officials indicate that a definite order further restricting the use of this class of equipment to coal loading is generally anticipated.

In spite of the stand which Washington officials appear to take in regard to unjust discrimination of open-top cars, that practice continues, and it appears that conditions will continue to grow worse.

Illinois sand and gravel producers are virtually at a standstill due to lack of cars, while great numbers of cars are loaded and unbilled at the coal mines. Some 600 miles of public road work depends on the gravel plants of Illinois for material, thousands of men depend upon the supply of sand and gravel for employment and much other construction work is being held up because of the short supply of material.

It is quite a loss to the Illinois producers to be without cars at this time of the year when their business should be at its peak.

Traffic Congestion Loosening in Texas

WICHITA FALLS, Texas—It is expected that the building operations of Central West Texas will soon show a big impetus as a result of the prospective general relief of congested conditions of railroad traffic. The first indication was a shipment of fifteen cars of cement to Wichita Falls, which enabled many builders to resume construction work. Many loaded cars are upon the sidetracks, but even when they are placed upon the unloading tracks it is difficult to get trucks, wagons and men to do the hauling. Conditions are being gradually improved, however, as is indicated by the large amount of building operations that are actually in progress.

Passed By The Screens

Incorporations

The Vance and Harding Co., of Batesville, Ark., is organized with a capital of $25,000 to quarry limestone and marble.

The Crescent Gravel Co., of Wilmington, Del., has been organized with a capital of $75,000 to produce sand and gravel.

The United Potash Co., of Baltimore, Md., has been incorporated by H. S. Jefferson, A. T. Wolfenden and T. T. Whitney, with a capital of $5,000,000.

The Daigler Sand and Gravel Co., of Williamsville, N. Y., has been incorporated by F. G. Bishop, Elizabeth Bishop and S. J. Russel, with a capital of $50,000.

The Salina Gravel Co., of Muskogee, Texas, has been organized with a capital of $10,000. The incorporators are A. F. House, L. W. Randolph and G. B. House.

The Earth Co., of Memphis, Tenn., has applied for a charter to construct quarries, mines, and deep wells. It has a capital of $600,000 and the incorporators are L. M. Jenney, C. T. Layne, J. B. Fletcher, G. H. Hodge, G. D. Wilcox and T. G. DePeel.

Gypsum Products

The Plymouth Gypsum Co., Fort Dodge, Ia., is about to install machinery and equipment for making blocks.

The Fort Dodge, Ia., gypsum mills are now paying a minimum wage of 57½c. per hour to unskilled labor. Skilled laborers are earning as high as $10 per 8-hr. day.

Quarries

The Whitehouse Stone Co., of Toledo, Ohio, which was destroyed by fire in July, is building a new plant which will cost $65,000.

The Ross Stone Co., Detroit, Mich., will soon open a quarry east of Afton, Mich. The company proposes to install a crusher and lime kilns for a plant of 100 bbls. capacity per day.

The Fish Stone Co., Columbus, Ohio, is one of many concerns whose plants on the bank of the Scioto River in the heart of the city must be moved because of the widening of the channel as a flood prevention measure.

J. S. McLaughiln & Son have purchased the New Ulm Stone Co., at Redstone, Minn., says the New Ulm Journal. Thirty men will be employed this summer and next winter. The plant will be remodeled and enlarged.

The Marble Cliff Quarries Co., of Columbus, Ohio, which buys its power from the city street car company, was shut down during the Columbus street car strike. The company has been running at full capacity and the shut down greatly hampered production.

The Frame Stone Co.'s plant at Bellevue, Ohio, has received an order for 100 cars of agricultural limestone. The need for this material is so great that it is being shipped in any type of car available and the large stock pile is fast diminishing before the plant's big 60-ton locomotive crane.

The Bluffton-Lewisburg Stone Co., which has six quarries in Ohio and Indiana, reports that with the exception of car shortage, the stone business has been very good. One of their plants is now working on an order of 1,250,000 tons of rock to be shipped to a cement plant in Michigan. This will furnish orders to run the plant the year around.

Tuscaloosa, Ala., reports state there are several quarries of good quality buiding stone near that city, in close proximity to the lines of the Tuscaloosa Railway and Utilities Co., and there is much talk of utilizing this material with which to construct houses, as there is no brick yard at Tucaloosa, and the price of lumber apparently will not stay still long enough for figures to be made on its probable cost. Some of this stone has been used in several structures about the city and the suggestion appears to have been well received. There is talk of a company to work the quarries and put the stone on the market. Owing to its formation it is very easy to quarry, and it is right on the surface of the ground.

Cement

The Canada Cement Co. has recently purchased a plant at Blairmore, Alta., which has a capacity of 2,500 barrels per day. Supt. Tagge of the company is now in British Columbia investigating the possibility of purchasing a plant in that province.

The Castalia Portland Cement Co., at Castalia, O., which has recently been reorganized by Pittsburgh men, is undergoing a complete overhauling. The plant will be electrified, and considerable new machinery will be installed. By next spring it will be very nearly a new plant.

The Indiana Portland Cement Co., Greencastle, Ind., Adam L. Beck, president, is now crushing stone, for which there is a large demand in Indiana on account of the new road-building program. Nearly all the roads contemplated in the new State-aid system are to be of concrete, so there is every prospect that the new cement mill will be loaded with business as soon as it starts operation—probably this month.

The Ironton Portland Cement Co., of Ironton, O., was forced to close down for five days because of coal shortage. The coal supply has been short for some time, due to a car shortage, and has now been entirely discontinued because of a coal miners' strike. The company went into the open market to purchase coal and resumed activities on September 8, after a shut down of five days. The plant has a number of large orders and cement must be supplied.

The Ogden Portland Cement Co., Ogden, Utah, has requested the Salt Lake freight traffic committee to establish the following rates on muriate and sulphate of potash from Bakers and Kosmos, Utah, to eastern points taking group A to F rates, in transcontinental freight bureau tariff No. 3-M: Group A, rate 67½; group B, rate, 62½; group C, rate, 62½; group D, rate 55½; group E, rate 55; group F, rate 50, and the following rates on manure or potash salts to: Group A, rate 57½; group B, rate, 52½; group C, rate 52½; group D, rate, 45; group E, rate, 45; group F, rate, 45, in lieu of the present intermediate, first class, fifth class or Class E rates.

The Canada Cement Co. has commenced active operations on the construction of their new Port Colborne plant for the manufacture of potash from the flue dust waste which is now lost through the smoke stacks. The plant will consist of several buildings, the main one being about 50x120 ft. in size. The foundations for the buildings are now being put in, and the erection of the structures will proceed as fast as a rather difficult labor situation will permit. The material used in the construction will be concrete and steel, and the management hopes to have the plant in operation inside of six months. The steel work and machinery for the plant is now coming forward from the manufacturers. About 50 men will be employed in the new industry.

The Wolverine Portland Cement Co., with plants at Quincy and Coldwater, Mich., is reported to be well situated to take advantage of the boom in the cement trade resulting from Michigan's hard-road building program. The Coldwater plant has been re-equipped recently with new boilers and is now running at full capacity after a shutdown of several months. The average combined output of the two plants is now 2,500 barrels of cement a day. It is understood the company has orders on hand to keep it at capacity production the remainder of the year. Wayne county uses Wolverine cement exclusively in all its construction. The company was organized in 1902, being the outgrowth of the Michigan Portland Cement Company, organized in 1897. Except for a period of four years, when part of one of its plants was destroyed by fire and while a railroad was being built to its clay beds, the company has paid an annual average dividend of 8 per cent. Present net earnings are expected to amount to $8,000 a month, as soon as final improvements are completed. The company is capitalized at $1,000,000, all common stock of $10 par value. There are no bonds. The last dividend was paid in December, 1917, and no dividend basis has been announced as yet for this year. The stock has a book value of well over $10 a share and the last balance sheet shows a surplus of $125,000.

Retail Dealers

The Goessel Cement Block Co., West Allis, Wis., has changed its name to the Wisconsin Cement Block Co. Arthur G. Goessel is secretary.

The Farmers Lumber Co., Mondovi, Wis., has been incorporated to deal in building material of all kinds. L. Schultz, L. Haunschild and W. Walsh are the incorporators.

The Consumers Coal Co., Ottumwa, Ia., has been incorporated for $10,000 to deal in lime, cement and building materials. The sole incorporator is Ed. L. Roth, Ottumwa.

The Black Earth Equity Association, of Black Earth, Wis., has been incorporated by E. C. Bardsley, J. M. Bollig and Frank Turk to deal in lime, cement, brick and tile. The capital is $20,000.

The Universal Lumber and Fuel Co., Lebanon, Dodge County, Wis., has had its charter amended to deal in cement, plaster and building materials of all kinds. The capital stock has been increased from $15,000 to $40,000.

The New England Concrete Pipe Co., Worcester, Mass., has been incorporated for $25,000. The directors are Arthur E. Farnum, president; Arthur E. Farnum, Jr., treasurer and Roy C. Farnum, all of Worcester.

The Kansasville Lumber, Fuel and Feed Co., of Kansasville, Wis., has been incorporated with a capital of $25,000 to deal in cement, grain and farm machinery. The incorporators are Stephen Cox, Fred Schroeder and Marion A. Loomis.

The Thunder Lake Lumber Co., Rhinelander, Wis., has been incorporated to deal in lumber and building materials of all kinds. The incorporators are J. D. Mylrea, H. C. Smith, (both of Wausau, Wis.) and Chas. F. Lovett, Rhinelander. The capital stock is $200,000.

The H. W. Brown Lumber Co., Oconomowoc, Wis., has been incorporated to deal in lumber, fuel and all kinds of building material. The capita stock is $20,000. The incorporators are Herbert W. Brown, Hurby Erickson and George Peterson, all of Waukesha county.

The Farmingdale Cement Brick Co., recently incorporated at Farmingdale, Long Island, N. Y., is putting in a plant with a capacity of 80,000 cement brick per day and expects to be operating in September. C. T. Willard and F. C. Willard, of the Willard Sand & Gravel Co., are interested in the new company.

The Flavin Marble Co., 3542 Shields Ave., Chicago, Ill., has been incorporated with a capital of $15,000. Its object is to buy, sell and deal in to manufacture, construct, erect and install marble, tiles, mosaics in buildings or elsewhere. The incorporators are Frank Flavin, 3542 Shields Ave.; Carl John Stein and George C. Hetzler.

Manufacturers

The Bucyrus Co., South Milwaukee, Wis., announce that they have opened a Cleveland office at 808 American Trust Bldg., Cleveland, O. This office will be in charge of E. G. Lewis, formerly with the New York office of the Bucyrus company and more recently president of the New Jersey Slag Products Co., Dover, N. J. Mr. Lewis has had long and thorough experience with contracting and excavation work of every description.

Personals

C. W. Denniston will succeed J. E. Maher as vice-president and general manager of the American Clay and Cement Co., of 803 Insurance Building, Rochester, N. Y.

L. H. Hawblitz, president of the Ohio Macadam Association, has been ill for some time of malaria, but is now on the road to recovery and his associates hope to see him back at work very soon.

Harry W. Benhart has been appointed representative of the Lakewood Engineering Co. in Buffalo, N. Y., with offices in the Ellicott Square Building. Mr. Benhart has had 10 years' experience in construction and 5 years as agent for contractors' equipment. He will devote his efforts to the general construction field for the Lakewood Engineering Co.

Passed By The Screens

Sand and Gravel

The **Kalamazoo-Greenville Gravel Co.** of Kalamazoo, Mich., is now doing an overtime business. Spring presented many adverse conditions, such as labor and car shortage. Large road contracts were considerably delayed, but at present the combination of a steam shovel and drag-line and plenty of cars has greatly increased the output.

The **United Fuel and Supply Co.**, Detroit, Mich., is planning to make some considerable changes in its plant at Oxford, Mich. The crusher plant, which is some distance from the screening plant, will be moved down and put into the screening building. At present the plant is driven by one large engine and this will be replaced by a number of motors so that if necessary one part may be operated without operating the whole plant.

The **Eau Claire Sand and Gravel Co.**, Eau Claire, Wis., has recently opened up a new deposit. The gravel from these new pits has been found to contain between 70 and 75 per cent gravel and the rest an excellent quality of sand. Analysis was made of sand and gravel from other pits in the newly opened territory and the company has discovered that it can also produce gravel that is of the right quality to use in sand blast machines. Two hundred cars of sand and gravel are being produced by the company per day.

New Jersey sand pits are very active. A local newspaper reports: From the great quantities of sand ordered from the many pits, there must be vast building operations in progress throughout the East. Owners of the pits are at their wits' end to fill these orders, although the plants are working overtime. The recent rain put a crimp in the shipment because there were washouts, and floods that did considerable damage. The business is far better than during the war, when there was a big demand from the government. The sand industry is a "straw" to the building operations, and it looks as though the present condition would continue indefinitely.

The **Arundel Sand and Gravel Co.**, Baltimore, Md., has been absorbed in a $7,000,000 corporation which includes other interests of Frank A. Furst and his associates. The principal other company included in the consolidation is the Furst Dredging Co. The incorporators are Frank A. Furst, W. Bladen Lowndes, Joseph J. Hock and Dallas L. Tyler, Michael Shehan, Charles M. Cohn, George F. Whiting, John Baer, Seymour Mandelbaum, S. Hiss, John T. Dailey, Edwin Warfield, Jr., J. T. Waldhauser and Charles K. Knapp. Joseph J. Hock is the general manager of the Arundel Sand and Gravel Co., and was a member of the War Service Committee on Mineral Aggregates.

The **Dunnebache Co.**, of New Richmond, Wis., has changed its location to Kenosha, Wis. This company is a dealer in gravel, lime, cement and building materials.

Dredging work on the Mississippi and Missouri rivers near St. Louis during the last month has been, in the opinion of St. Louis producers, what will probably be known as the record month in the production of sand and gravel.

Texas sand and gravel producers will have to pay a state tax on 67 per cent of the sand and gravel taken from state streams and used in the construction of the Galveston County causeway, according to a recent court decision. The 67 per cent is the part of the work which represents the railway's share of the expense. Public works can use sand and gravel which is tax free.

The **Genesee Sand and Gravel Co.**, Detroit, Mich., of which Horatio S. Earle is president, has been trying to get a rates schedule of shipments. A rate list to the various towns in the shipping district were submitted to railroad authorities, and although they ranged from 60 cents to $1.50, but one of these was granted. A contract for 400 cars of gravel to be used in road work had to be canceled because cars were not available.

A **steel cable** supporting a derrick on the brink of the Bambrick Brothers' Stone Quarry in St. Louis, snapped at noon on September 3, and the derrick fell 220 ft. to the bottom of the quarry, killing one man and injuring three others. Robert Green, 18 years old, was fatally hurt, dying two hours after the accident. John Frese, an engineer, and two laborers were cut and bruised. Frese was standing near the derrick on the edge of the quarry and was struck by an end of the cable. The others were working in the bottom of the quarry.

Lime

The **Wilson Lime Co.**, Wilson, Wis., has dissolved. This company has done no business since 1913.

The **Mississippi Lime & Material Co.**, Alton, Ill., has absorbed the Bluff City Lime Co., Hannibal, Mo.

The **Germano Lime Co.**, Germano, Ohio, has been out of the lime business since the war. This company is now handling coal. S. B. Kuhn is president and general manager.

The **Manitoba Gypsum Co.**, Winnipeg, Man., has awarded a contract to Frank S. Jennings for an addition to their lime plant. The new building will be three stories, mill construction, frame and stucco.

The **Cedarville Lime Co.** has been reorganized and this winter will install a hydrating plant and will make quite a few other improvements. It will arrange for the crushing of lime and will handle agricultural lime.

Potash

Estimates of the potash find in Tioga and Potter counties place the value to the owners at $480,000,000. Col. Henry C. Demming, of Harrisburg, consulting state geologist, is confident that the deposits will be sufficient to supply the world's demand for several generations. William Cargill, secretary-treasurer of the New York-Blossburg Coal Co., and several other Syracusans interested in the company have been over the property. Early development of the property, which consists of 2,200 acres with semi-bituminous coal estimated at 13,000,000 tons, is now expected. The coal is especially suitable for steaming and smithing purposes. Walter J. Bennett, president of the company, says that just now he is principally interested in having a railroad built to the property. Announcement of the discovery of potash has caused a boom in the stock of the company, officers of the concern declaring that there is a brisk demand from Syracuse people who realize the possibilities of the situation created by the news that potash has been found. The authorized capital of the company consists of 2,000 shares of 8 per cent cumulative preferred stock, par value $100 each, and 10,000 shares of common stock having no par value. One-half share of common is given as a bonus with each share of preferred. Dr. William Frear, professor of experimental agricultural chemistry, and vice-director of the experimental station of the Pennsylvania State College, has returned from a special trip to Tioga county, where he visited the mountains where the big beds of potash are reported discovered. His report, it is said, is not of such a character as to induce farmers to indulge in an excessive jubilation over the possibility of a bountiful supply of potash or any reduction in the price of that commodity.

Phosphate

The **Harsh Phosphate Co.** is installing a kiln-drying and crushing plant at Nashville, Tenn., and will make a specialty of ground phosphate rock and phosphate filler.

The **Seminole Phosphate Co.**, Borden Bldg., Goldsboro, N. C., has let contracts for $40,000 in new buildings. W. F. Walker, Goldsboro, is president, and D. J. Rose, Rocky Mount, N. C., is construction engineer. A contract for machinery has been let to the Utility Works.

CLASSIFIED ADVERTISING

Rates for advertising in the Classified Department: 2.50 per column inch per insertion. Minimum charge, $2.50. Please send check with your order. These ads must be paid in advance of insertion.

Help Wanted

POSITION OPEN

for a first class quarry superintendent. Must be capable of handling quarry and crushing plant. Advise stating age, experience and reference. Good salary for right party. Central New York.

Box 1328 Care of Rock Products

Plants for Sale

FOR SALE

Crushed stone plant near Wymore and Blue Springs, Neb., on Union Pacific and C., B. & Q. railroads; the quarry farthest west in Nebraska or Kansas; 40 ft. of stone; light stripping; large territory; good prospects; 67 ft. of shale under quarry bed. Ideal location for fancy brick or Portland cement plant. Address

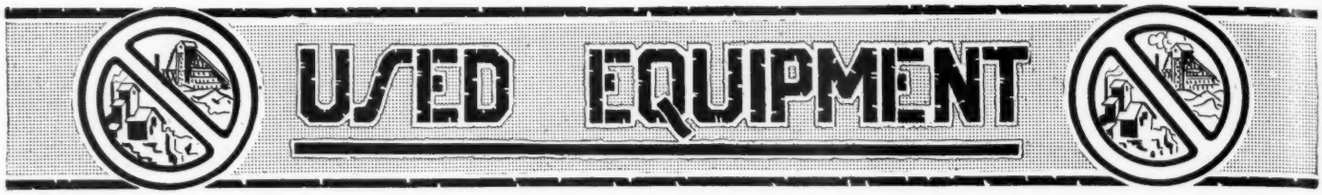
G. H. DAVIS, Blue Springs, Neb.

Gravel Business in Iowa For Sale

On account of owner's illness. Doing fine business. Will sell on easy terms to responsible parties. Address

Box 1335 Care of Rock Products

For better service say, "I saw it in ROCK PRODUCTS"



Rates for advertising in the Used Equipment Department: $2.50 per column inch per insertion. Minimum charge, $2.50. Please send check with your order. These ads must be paid in advance of insertion.

PRIVATE EQUIPMENT

Bucyrus Shovel, 65 ton, 2½ yd., on railroad trucks.
Bucyrus Shovel, steam traction, ½ yd. dipper.
Sturtevant Mill for pulverizing.
Locomotive, standard gauge, 35 ton.
20-ton standard gauge Shay Locomotive.
Duplex Compound Piston Pump, 3,000,000 gals. per day.
Milwaukee D. C. Generator, 8½ K. W., complete.
Tractor, Holt Caterpillar, 75 H. P.
Franklin Compressor, 530 ft., steam.
Drag line, caterpillar, ½ yd. dipper.
1800 ft. track, cars and locomotive, all 36" gauge.
6000 ft. track, cars and locomotives, all 24" gauge.
10 Western Dump Cars, 36" gauge, 4-yd.
10 ton steam roller, 3 wheel.
4 horizontal return tubular boilers, 72"x18', 150 H. P.

D. B. STRALEY, Crown Point, Ind.

FOR SALE

One 18-ton Davenport Saddle Tank Locomotive, 48-in. gauge.

THE CHARLES STONE CO.
Marion, Ill.

FOR SALE—CHEAP

7½ Austin Elevator, friction drum hoist, 30" gauge end dump quarry cars, miscellaneous 6" to 14" new and second hand belting, pulleys, screens, etc.

Prices on Application.

THE FRED R. JONES CO.
139 No. Clark St. Chicago

FOR SALE

Four 36" Sturtevant Emery Mills.

CLIFFORD L. MILLER
280 Madison Ave., New York City

RAILS

All sections of new and second-hand, on hand for quick shipment. Also purchase old and abandoned plants for dismantling purposes.

M. K. FRANK, Pittsburgh, Pa.

FOR SALE

BUCYRUS 40-R — Yard and half dipper, standard gauge type, shop number 2254. Boiler perfect. Shovel in A-1 condition.

RACINE STONE COMPANY
134 So. LaSalle Street Chicago, Illinois

1—No. 8 Gyratory Crusher.
1—No. 3 Universal Williams Mill.
These are used machines but in good condition.

H. A. JOHANN
1806 Railway Exchange St. Louis, Mo.

Repaired Contractors' Equipment

Steam Shovels

Model 60 Marion Shovels, 2½-yard dippers, Nos. 1999, 2059
Model 75 Marion Shovel, 4-yard dipper, No. 2191

Locomotives

2—American 10 x 16" Locomotives, 36" gauge, with butt joint boilers
4—18-ton 10 x 16" Dinkeys, 36" gauge
2—12-ton 9 x 14" Dinkey, 36" gauge
1—10-ton, 7 x 12" Dinkey, 36" gauge

Cars

20—12-yard Western Air Dump, standard gauge
75— 4-yard Western Steel Beam, 36" gauge
25— 4-yard Oliver and K. & J. Wood Beam, 36" gauge
1—Western narrow gauge hand operated Spreader
26—12-yard Western air-dump standard gauge cars, 19' bed.

Hoisting Engines

1—8½ x 10 DC 2-D Lambert, with boiler
1—7 x 10 DC 2-D Lidgerwood with swinger, no boiler
1—6¼ x 10 DC 2-D Mundy, with attached swinger and boiler

Clam Shell Buckets

2—1-yard Owen
1—1-yard type "E" Blaw
1—¾-yard Owen

Cableway

1—Lidgerwood Cableway, 1164-ft. span, with 9 x 10" DC Reversible Link Motion Cableway Engine, 3-ton capacity

We have a large stock of thoroughly repaired Construction Equipment of all kinds ready for immediate shipment.

H. KLEINHANS COMPANY

Union Arcade Pittsburgh, Pa.

The advertiser wants to know that you saw his ad in ROCK PRODUCTS